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# VETERINARY MEDICINE

November 1934

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Junior FORT DODGE
# BIO-CHEMIC REVIEW

NOVEMBER 1934

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● In hundreds of communities veterinarians have found an exceptionally remunerative means of building up winter practice in treating horses for bots and other endoparasites.

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# Veterinary Medicine

Registered in U. S. Patent Office

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D. M. Campbell, Editor A. T. Kinsley, Associate Editor
H. J. Mostyn, R.K.O. Bldg., New York, Eastern Representative

Less than half of the milk marketed in the United States is consumed as fluid whole milk or cream. More than half is used as manufactured dairy products.

A new acid indicator, nitrazine yellow, is thought to be superior to litmus. It is blue in an alkaline solution, grey in a faintly acid solution and brighter yellow in sharply acid solutions.

Weckel and Jackson of the University of Wisconsin have developed a method practical commercially for irradiating evaporated milk to increase its Vitamin D content, and such evaporated milk is now on the market. When diluted with an equal volume of water, this rickets preventing evaporated milk has 50 Steinbock units of vitamin D per quart. Normal milk has about 10 to 12 Steinbock units per quart.

Massachusetts has a new statute against docking and tail setting in horses. The penalty for docking (or causing or permitting it) is imprisonment for not more than a year or a fine of from $100 to $300; for tail setting (or causing or permitting it), a fine of $250. No horse may be exhibited at any horse show in the commonwealth if its tail has been docked or set up since the law was enacted.

The knowledge of diseases of wild animals as they occur under natural conditions is very meager.

The diurnal habit set up in birds in response to the alternation of periods of light and darkness, which mechanism seems to regulate the general metabolism of the bird-host, seems to inject a certain diurnal periodicity in the oocyst production of avian Isospora, according to recent research at the University of Wisconsin.

The annual mortality in the poultry industry represents an appalling loss. The following estimates have been made regarding annual losses:

| | |
|---|---|
| $20,000,000 | in embryo mortality |
| 18,000,000 | in chick mortality |
| 20,000,000 | in laying hen mortality |
| $58,000,000 | in total mortality |

Most foods ordinarily consumed by man are devoid of vitamin-D. Traces of this vitamin are found in milk and butter produced during the summer months, but, with the exception of fish oils, egg yolk is the only natural foodstuff containing appreciable amounts of vitamin D. For this reason, combined with their high quality protein, phosphorus, and vitamin A and B content, eggs are a particularly valuable food.

Poultry feeding work at the Kansas Experiment Station indicated that ample supplies of vitamins A, B and D are essential to both numbers and hatchability of eggs. Alfalfa meal and yellow corn provided ample amounts of vitamin A. Ordinary grains were found to satisfy the need for vitamin B. Cod-liver oil and direct sunlight or sunlight admitted through good glass substitutes were found to be the best sources of vitamin D.

A practical means of preventing tuberculosis from becoming troublesome in poultry flocks is the disposal of old hens. As the disease generally develops slowly, an affected fowl seldom becomes a menace to others in the flock until about 16 months old or older. At that age a hen has finished her first laying year and if she has been fed properly should be in good condition for slaughter. If the flock is replenished with pullets raised from clean stock, the premises will be constantly restocked with disease-free birds. The sale of hens will pay a considerable part of the cost of raising the pullets, and the owner avoids having to carry the hens through the non-productive, molting season of late summer and early fall.

Losses totaling 10,000 chicks were observed in a commercial hatchery of 50,000 chicks less than 60 days old. The average loss in the home plant was 63 per cent, and in the chicks that were sold as day old, 13 per cent. The morbidity percentage was much higher, according to the clinical appearance of the flocks. The chicks that survived made good recovery, and 60 days after hatching had developed into normal birds. The diseased condition was characterized by whitish ulcers or pseudomembranes in the crop, brownish or mucoid deposits in the proventriculus, and ulcers in the gizzard. The lesions in small chicks were often so small as to be easily overlooked. On mycological examination yeastlike fungi were isolated from the crop, proventriculus, gizzard, gallbladder and intestine. The predominating organism was a yeastlike fungus resembling *Monilia albicans;* the other observed types resembled *Oidium lactis* and *M. krusei.*

From experiments conducted at the College of Agriculture, University of Nebraska, it is concluded that artificially drying alfalfa tends to preserve its vitamin E content to a greater degree than does field curing.

The minerals in which farm rations may be deficient are: calcium, phosphorus, sodium, chlorin, and very rarely, iodin. There is no evidence that farm rations, in the Middle West at least, are ever deficient in other minerals.

Recent tests in Michigan show that 100 pounds of tankage saved 452 pounds of corn in pigs fed grain on pasture. Tankage feeding also enabled the pigs to reach market weight from 9 to 19 days earlier than when no tankage was fed.

Unless evidences of iodin deficiency are observable, no benefit is likely to be derived from feeding iodin supplements to dairy cattle. Iodin deficiency is evidenced by the presence of goiter in the calf at birth or by the development of goiter soon after birth.

The choice of a worm medicine should depend upon the worm to be removed, the efficacy of the medicine and the safety of the drug for the animal. In the selection of worm medicine, the margin of safety must be borne in mind constantly.

In a study of 85 cases of ringworm in children, Canadian authors found evidence that cats play an important part in disseminating the disease. Of 57 cases of ringworm in children which the authors studied subsequently, *Microsporon audouni* was the cause in 43, and *Microsporon felineum* was the cause in 14.

A fifty per cent glucose solution injected intravenously in cats with reduced blood pressure, produces a final sustained rise in blood pressure; it causes a sustained rise in pulse pressure; it produces a sustained reduction in pulse rate; slow injection is preferred to rapid injection. Pre-operative injection of 50 per cent glucose diminishes the fall in blood pressure due to hemorrhage.

*Ostertagia circumcincta,* a nematode of the superfamily Strongyloidea is a common parasite of sheep; infection may be accomplished experimentally in the host by oral administration of the infective larvae. The eggs complete the three-celled stage and possibly the four-celled stage of development within the adult female. The remaining stages usually are accomplished after deposition. The eggs hatch in from 18 to 24 hours.

* * * *

Honey bees are by far the most numerous of animal kind that furnish food for man. A recent "bee census" indicated there were 280 billions at work in the United States at the heighth of the season. They produce well over 150 millions of pounds of honey annually, about one pound two ounces for each inhabitant of the country. Contrary to popular impressions, there are no domestic bees—all are wild regardless of whether they are kept in apiaries or live in the forest.

* * * *

In a survey of kidney-worm-infested hog pastures in the vicinity of Moultrie, Ga., larvae of these worms were found almost entirely on moist, shaded soil where they were protected from light and desiccation. The greatest concentration of larvae was found to occur beneath piles of corn husks, cobs and other *debris,* on areas where hogs were fed. Larvae were not recovered from dry soil at any time during the investigation, nor even from moist soil when it had been exposed to sunlight for more than a few hours.

* * * *

Experiments to determine the life span of fleas without a host under the natural atmospheric temperatures and humidity obtaining in Manila, carried out by the U. S. Public Health Service, led to the conclusion that under the usual atmospheric conditions and without a host the life span of fleas would probably not exceed five days ordinarily. However, on voyages during which considerable rain is encountered throughout the voyage, thereby raising the relative humidity within the hold, the life span of some fleas may be extended to 12 days.

Equine encephalomyelitis has been termed blind staggers, brain fever, cerebrospinal meningitis, Kansas-Nebraska horse disease, botulism and what not. It is recognized that other forms of encephalitis may occur at times in horses.

* * * *

It is believed that *Trypanosoma evansi* causes death in the equine species, not by the production of a toxic substance liberated by the disintegration of the organisms, nor by the exhaustion of the blood sugar and glycogen reserve, but by an asphyxia from an uncompensated acidosis, the mechanism of which is still undetermined.

* * * *

When a diagnosis of encephalomyelitis has been made in a given group of horses, temperatures of all horses and mules on the premises should be taken daily if possible. High temperature and conjunctival congestion often appear twenty-four to forty-eight hours before any other positive clinical signs. Additional cases may occur in seven to ten days after the first case has come to clinical notice.

* * * *

Automobiles, trucks, tractors, improved farm machinery, electric motors, and gas engines have in varying degrees displaced horses and mules. Of these the automobile, the truck, and the tractor have probably resulted in the greatest displacement, although the amount is hard to measure. In the cities automobiles and trucks have displaced about nine-tenths of the horses and mules.

* * * *

Horses for slaughter have become important in the last few years. In the East they are mostly worn-out work animals; in the West they are range stock, including wild horses. In addition to those slaughtered in federally inspected plants, a number are killed for fertilizer and glue in plants not federally inspected. The meat of horses slaughtered for human food is exported to countries where horse flesh is an article of diet. Horse slaughtering establishments constitute an important source of raw materials for dog foods both canned and dry.

# Simple and Practical Methods of Examining Blood

By R. E. NICHOLS,
Columbus, Ohio

ROUTINE laboratory methods of examining blood, to be conducted as auxiliaries to the clinical examination of patients, must possess certain requirements or qualifications. They must be of such a nature that many tests may be run at the same time. They must also be fairly simple and concise and not too complicated or time-wasting. They need not be the most accurate methods but should be reasonably accurate. In many determinations a small percentage of error is insignificant from the standpoint of clinical interpretations. The fact that there is an alternation in a particular constituent of the blood is often of as much value clinically as the measurement of the actual degree of alteration. With the foregoing facts in mind, this method of examining blood here described was adopted at the Veterinary Clinic of Ohio State University.

The procedure is divided into two parts, (1) macroscopic and (2) microscopic. The sample of blood is examined first macroscopically and if no deviations from the approximate normal are found, no further tests are made. If any alterations are found and further examination is indicated, the more detailed microscopic method is resorted to.

### Macroscopic Examination

The macroscopic examination consists of the following:

1. Determination of the sedimentation rate. (SR)
2. Determination of Hemoglobin. (Hb)
3. Determination of the volume percentage of red cells. (%RC)
4. Determination of the volume percentage of white cells. (%WC)
5. Examination of the supernatant plasma.

*Sedimentation Rate.*—The sedimentation of blood cells (settling of the cells in the plasma) is not a recently discovered phenomenon. Galen in the second or third century is credited by many as the first to observe this phenomenon which he called *Crusta Phlogistica.* For centuries physicians have known about it and have considered it particularly important both theoretically and practically. When blood-letting became a part of the past and the humoral doctrines forgotten because of the advent of the cellular theories of Ehrlich and Arneth and their colleagues, it, practically, was forgotten. However, it was rediscovered in 1918 by Fahraeus and is now an accepted routine in many hospitals.

Many workers have devised their own techniques for recording sedimentation. This has brought about much confusion in comparing the results obtained. There are, however, two methods which warrant brief description:

Cutler's method *(Amer. Jour. Med. Sci.* 1926, 171:882; *Amer. Rev. Tuberc.* 1929, 19:544; *Amer. Jour. Med. Sci.* 1932, 183: 643) combines both the time method of Linzenmeier *(Deutsch. Med. Wochnschr.* 1922, 48:1023) and the distance method of Westergren *(Acta. Med. Scand.* 1921, 54:247). A special Cutler tube of 1cc capacity and graduated downward from 0-50mm is used. The height of the column of cells is noted at intervals and recorded graphically, the abscissa representing the time and the ordinate the distance.

The most recent method of recording the sedimentation rate is the photographic method. *(Amer. Jour. Med. Sci.* 1934, 187:65). Light passing through a tube

containing the sample of blood registers on sensitized paper fastened to a revolving cylinder. The light passes through the plasma and not the cells. This method is by far the more accurate for it yields a complete picture of the rate of sedimentation in tube graphic form.

Many theories have been expounded in an attempt to explain the sedimentation of cells. The modern view point is well expressed by Cutler:

It is safe to say that out of the host of theories propounded, from autoagglutination, electrophysical reaction, increased fibrinogen content of the blood plasma, down to the presence of some specific something (ferment) in the plasma, there is not one universally accepted explanation. Regardless of the theory the ultimate cause depends upon the *degree of cellular destruction* going on in the body. The sedimentation reaction is generally regarded as a measure of pathological activity and therefore as a symptom of an entirely general kind. It is a fine quantitative measure of the change in the blood produced by a destructive process somewhere in the body. It does not diagnose, nor does it localize the infection. It does not indicate the state of the diseased organ, but it does reflect the disturbance produced in the organism through the absorption of products of infection. (*Amer. Jour. Med. Sci.* 1926, 171:882.)

In diagnosis the test has two values, first as a diagnostic *lead* and second as a diagnostic *gauge*. As a diagnostic lead it indicates the presence of a serious disease not infrequently before the disease can be recognized by the usual clinical and laboratory methods. As a gauge of the constitutional disturbance produced by the pathologic process, it indicates the intensity of the disease and thus, like fever or pulse rate or blood count, but more exactly, helps to complete the diagnosis in a qualitative sense.

As a prognostic index and, similarly, as a guide in treatment, the rate of sedimentation has been shown to be a more accurate and reliable reflection of the real condition of the patient than our usually accepted procedures. It invariably becomes more rapid as the disease progresses, and approaches stability only as the physical condition returns to normal. It is not influenced by psychologic factors and may be the only warning of disaster among promising clinical signs, such as gain in weight and the absence or subsidence of symptoms. In this way it is often the only, or the most accurate, evidence of favorable, or of unfavorable, response to treatment.

The test is very simple to perform and to interpret and is inexpensive. It is a clinical procedure and can be carried out in the office, in the dispensary or at the bedside. The complete result is available within an hour and in case of necessity the sedimentation test will give valuable information within the first half hour.

Its greatest field of usefulness should be in office and dispensary practice, especially in the latter, where large numbers of patients must often be seen in short periods of time and by men seeking experience. Properly interpreted and used with an open mind, the test should in time become one of the most widely used tests in clinical medicine. (*Amer. Jour. Med. Sci.*, 1932, 183:643.)

The use of the sedimentation test in distinguishing malignancy is well expressed by Rubin *(Amer. Jour. Med. Sci.* 1927, 174:680*)*:

The erythrocyte sedimentation reaction was studied on 127 patients with various forms of malignant tumors and in various stages of the disease. The rapidity of erythrocyte sedimentation was found to parallel the extent of the disease and the condition of the patient. In this respect is afforded a better guide to the condition of the patient than the temperature chart. Repeated examinations revealed the fact that the progress of the disease was invariably accompanied by an increasing rapidity of erythrocyte sedimentation.

Briefly a rapid S. R. occurs in the following:

1. Pregnancy (especially during the latter months).
2. Acute infections or acute exacerbations of chronic infections.
3. Malignancy (the S. R. may be used to distinguish malignant from benign growths except in very early cases of malignancy).
4. It is also observed in severe intoxications, metallic poisons, most severe anemias and in some endocrinopathies.

A slow S. R. is encountered in:

1. Liver diseases as catarrhal jaundice and cirrhosis.
2. Anaphylaxis after serum injections.
3. Severe cachexias.
4. Erythrocytoses.

Repeated examinations are of more value than single ones. One may follow the course of a disease and determine whether the patient is improving or getting worse by observing whether the S. R. is returning toward the normal or not. This is often a more accurate index than temperature or other symptoms.

*Hemoglobin.*—There are a large number of methods for determining hemoglobin. The instrument in use now at the clinic is the new and improved Dare. We believe it to be of the most practical value for our purposes. We fully realize the

shortcomings of the old type of instrument, many of which are still in use at the present time, but, as recommended by Dr. A. H. Sanford of the Mayo Clinic, the new instrument has been corrected to a large extent and checked by Van Slyke's oxygen-capacity method of determining hemoglobin. The new instrument has a gram scale as well as a percentage scale, the upper part of the chamber has been altered and the capillary space of the pipette standardized to .007 of an inch with a tolerance of .0003 of an inch. The percentage of error is small, if in the hands of a careful worker who takes into consideration the fact that the eye tires quickly when comparing colors. Such, of course, is true with all colorimetric methods.

The instrument is advantageous for clinical use in that only a drop or two of blood is needed, whole, citrated or oxalated blood may be used and only three minutes are required for each determination. No solutions need be made and the instrument may be carried anywhere.

Determinations of hemoglobin in conjunction with determinations of the volume percentage of red cells give the clinician an idea of the kind and degree of anemia. Repeated examinations aid him in following the course of the disease and determining the efficacy of his therapeusis.

*Volume Percentage of Cells.*—The practice of counting red blood cells in the counting chamber using the microscope has been done away with entirely and the determination of the volume percentage of red cells of centrifuged blood substituted for it. We believe we can learn as much clinically concerning the presence and kind of anemia by the use of the volume percentage of red cells in conjunction with hemoglobin determinations as could be learned by the actual counting of the cells and with considerable less expenditure of time.

We have also eliminated the counting of leucocytes in the counting chamber and determine the volume percentage of leucocytes by measuring the white cell layer on top of the column of red cells after the blood has been centrifuged. Clinically this will tell us whether there is a high, low or normal amount of white cells.

*Plasma.*—The color of the supernatant plasma can be compared with standard solutions of potassium bichromate and the "icterus index" obtained. If one is observing and has examined many specimens of normal plasma, one can determine the presence of *icterus* without using bichromate solutions. Such, of course, requires practice, but one may become very proficient at it.

### Microscopic Examination

The microscopic examination of the blood consists of:

1. Examination of the smear.
2. Examination of the whole blood.

*Examination of the Smear.*—Methods of making smears and staining them are many.. The "drag" method has been adopted because of its simplicity and because no pressure is placed on the drop of blood in making the film. If good quality slides and precision in technique are used, fairly accurate results will follow.

Wright's stain seems quite applicable to clinical needs, but if more careful study of morphology and degenerative changes is desired, other stains may be used. A very good one for bringing out granules in particular is equal parts of Giemsa's essential solution and acetone. This method requires more time than Wright's.

The practice of examining the whole smear under low power before classifying the different types of white cells is a good one. One should note whether the film is even in thickness or not, whether it is uniformly stained or not, how intense it has been stained and whether there are parasites present or not.

Examination of the red cells will often cast additional light upon the type of anemia which one is dealing with and re-

peated examinations often aid in determining whether the patient is becoming better or worse. Variations in size suggest faulty production. Variations in shape and size suggest anemia of a pernicious type. Basophilic staining suggests that young cells are present. Ring cells with a clear unstained center and cells which have not taken the stain at all (shadows) suggest reduction in the hemoglobin content of the individual cell. Nucleation apparently indicates regeneration. Increasing numbers of nucleated cells usually occur in the latter stages of diseases associated with severe anemia and often are an unfavorable indication.

The differential leucocyte count now in use at the clinic includes Schilling's classification of neutrophilis. Wiseman's classification of lymphocytes, large mononuclears and transitionals combined as monocytes, eosinophils and pseudoeosinophils, and basophils.

To fully comprehend Schilling's classification, one should be familiar with the development of the neutrophil. The evolution from parent cell to mature segmented neutrophil is a gradual one. Schilling divided this evolution into four main steps according to the morphology of the nucleus. The first step or group includes the myelocytes which have a large round nucleus with no indentations. The second step or group contains the juvenile whose nucleus is slightly indented. The third step or group embraces the "stab" or "band" cells. The indentation of the nucleus of this type of cell is deep but no true lobulation is present. The last step or group includes the segmented nuclear neutrophils whose nuclei, as the name implies, are truly segmented. According to age, the myelocyte is youngest, juvenile next, band or stab next and segment the oldest. The myelocyte and juvenile are extremely rare in normal blood, bands are relatively few in number and the mature segments make up the greater part of the neutrophils. An increase in the percentage of younger forms is called a "shift to the left," while a decrease in the percentage of younger forms a "shift to the right."

*Wiseman (Jour. Exp. Med.* 1931, 54:271) examined the blood of rabbits with normal and hyperactive lymphatic tissue and found, in the latter, a greater percentage of lymphocytes with heavily basophilic cytoplasm and numerous mitochondria. He states:

> . . . This indicates that cytoplasmic basophilia and mitochondrial content can serve as criteria of the degree of maturity of the lymphocyte, these characters having the same significance in this relation as obtains with other blood cells. Basophilia is the more evident and reliable indicator of youth of the cells. The classification of lymphocytes into three groups, according to degree of basophilia, has yielded figures which show the proportions of the three to be relatively stable in blood from normal adult human beings and rabbits. Size is not strictly a function of age in lymphocytes.

Of course, in classifications such as the above, one encounters "border line" cells and is uncertain as to which group to put them in. Fortunately, these are usually few in number and do not affect the end result materially. In classifying lymphocytes it is quite essential to examine the smear previous to counting to determine the intensity of its stain.

No hard and fast rules can be made concerning the reactions of the leucocytes during disease for one must always keep in mind the fact that these reactions are controlled by not only the stimulus and the degree of stimulation but also by the ability of the patient to respond to the stimulus. However, there are certain generalities well expressed by Kilduffe (Clinical Interpretation of Blood Examinations, 1931, Lea & Febiger, Phila.):

> 1. Slight neutrophilic leukocytosis, persistence of eosinophiles and slight nuclear shift, if this picture is sustained, is of favorable import.
>
> 2. Slight, or no more than distinct, leukocytosis coupled with moderate shift to the left (not over 4 per cent of young forms and 10 to 12 per cent of old forms), decreased eosinophiles and lymphocytes warrants the diagnosis of infection, but gives no prognostic data.
>
> 3. High leukocytosis, marked and continuing shift to the left, the presence of the septic factor, and decreased lymphocytes, form a picture of ominous import.
>
> 4. A progressive fall in the total count in the presence of lymphopenia, the septic factor and an increasing shift to the left warrants a fatal prog-

nosis with a considerable degree of certainty.

5. Eosinophilic leukopenia with rising total count signifies pyogenic infection, with falling total count, a lack of reactive ability on the part of the patient.

6. Lymphopenia with a rising leukocytosis suggests a progressive inflammatory process; with a falling total count the prognosis is bad.

7. Lymphocytosis associated with a return of the total count and index toward normal accompanies convalescence.

8. In surgical conditions in general the neutrophilic percentage count when increased, and especially in the presence of the septic factor, forms a rather reliable guide to the presence of pus, the percentage count being, in a general way, proportionate to the severity of the infection.

9. The presence of a persistent leukocytosis is against the benignity of any tumor, and a steadily increasing leukocytosis in malignant disease is significant of rapid growth or metastasis.

*Examination of the Whole Blood.*—Since the occurrence of heart worm infestation in dogs is apparently on the increase, one should become familiar with methods of examining blood for the microfilaria. One may place a drop of fresh blood on a slide, cover it with a coverslip and examine it under low power. Microfilaria, if present, will be seen lashing about tremendously. Their bodies are more thread-like and not as stocky as the hookworm larvae. Their motions are more rapid than the hookworm larvae.

One may concentrate parasites of the blood by hemolyzing the red blood cells of a given quantity of blood (5cc) with nine parts of 2% acetic acid, centrifuging, and examining the sediment thrown down into the bottom of the tube.

A single blood examination merely represents the condition of the blood at the time the sample is taken. A composite picture of several successive examinations yields the greatest value. A single determination of any one constituent of the blood is very rarely pathognomonic —diagnostic in itself of any particular diseased condition. By careful scrutiny of repeated determinations of many different components of the blood, taken, not singularly, but as a whole, a clearer conception of the condition present, a wiser choice of therapeutic measures and a better knowledge of the ultimate outcome will ensue.

## Green Feeds Vital to Breeding Herds

Premature, weak or dead calves are likely to result if breeding herds are carried for six months or more without some green hay or pasture. This has been the experience of cattlemen in the past and is also the result of deliberate experiments of the U. S. Department of Agriculture.

To offset any lack of green feed during the summer drought, the Department urges farmers to take every advantage of fall pastures, especially the green feed available for grazing in fall-sown or volunteer grain crops. In some localities winter-wheat farmers and livestockmen can help one another by making arrangements to graze the wheat fields this fall.

The specific deficiency due to a lack of green feeds is vitamin A. When a severe drought occurs, as during the past summer, the hot sun stops plant growth, turns the grass brown, and destroys the vitamen A content, which is closely associated with the green color. Cows from such pastures go into the winter without a reserve of the very necessary vitamin which green pastures supply.

Even cows which are fed grain or similar concentrates, as a supplement to roughages this winter, are likely to have reproductive difficulties if the roughages have lost most of their green color.

Vitamin A is ordinarily supplied by summer and fall pasture in quantity sufficient to carry non-milking cows through the winter, even on low-quality roughages. But for heavy-milking cows, the best quality of alfalfa hay or other green roughage is needed to prevent defective reproduction.

The need for green feed, or vitamin A, can ordinarily be supplied during the winter by good silage, or green hay, such as leafy alfalfa. Where these feeds cannot be obtained, or their quality is impaired, it may be feasible to supplement the ration with alfalfa-leaf meal, or other feeds rich in vitamin A, such as carrots or cod-liver oil.—*U. S. Department of Agriculture.*

# An Improved Method for Mounting Specimens

By K. F. SMITH,
Columbus, Ohio

THE preservation of pathological specimens has in recent times become a matter of great importance, both from an educational point of view and that of scientific record.

In the earlier methods bulky jars containing alcohol and later formalin were used for this purpose. Their inherent disadvantages, such as causing the color to fade and the tissue to shrink, led to the search for more ideal methods. The Kaiserling method was perhaps the nearest approach in its time to this goal of preventing physical and chemical changes in the mounted specimen. Since then many improvements over this method have been attempted and devised.

The following method, evolved by the author, constitutes not only an improvement upon the preserving medium but also upon the container used.

For the container, a cell is used consisting of two thin glass plates (5x7 inch photographic plates) and a metal frame of stainless steel, forming the lateral border. The most convenient depth for the metal frame is about ¼ inch. First, the metal frame is cemented to one glass plate, forming a tray. Lacquer is used for cementing. After the lacquer has dried, and the inside of this new tray been cleaned with xylene, it is filled two-thirds full with arsenious acid glycerine jelly. The previously prepared specimen is then carefully lowered in this embedding medium. If airbubbles have formed, they are immediately withdrawn by the use of a capillary pipette. Finally, more arsenious acid glycerine jelly is poured in this chamber to fill it level. Experience has shown that it is advantageous to place this chamber in another tray, and have the arsenious acid glycerine jelly overflow the chamber until the steel bars of the mounting cell become just immersed in the jelly. Next, the cell is closed by lowering another glass plate over the frame, again taking care to avoid the formation of airbubbles. A weight is placed on top of the plate to bring the latter in contact with the steel frame; it is left in position for 12 to 24 to 48 hours in order to give the jelly time to congeal. When this has been accomplished, the excess gelatin is removed from around the cell, and the top plate sealed to the frame with lacquer as previously. Another twelve hours are allowed for drying. Then, ordinary asphalt is used for an additional seal, filling the space between the projecting edges of the glass plates over the metal frame. To protect the asphalt, a strip of ordinary adhesive tape is sealed over it; this seal is then given a coat of lacquer. Finally, a strip of black gummed cloth mending tape is placed around the lateral border of the cell, and a final coat of lacquer applied to it.

The advantages of the improvement described here are obvious. By the use of thin glass plates a surface is secured which responds readily to temperature changes, and their concomittant action of expansion and contraction upon the mounting medium, thus preventing the development of unsightly cracks and bubbles in the mount. It is very improbable that all the six separate and independent seals interposed between the mounting medium and the outer air will all become broken at the same place, and allow air to enter. Thus, the safety factor is very high. Other advantages are the convenience of handling and storing the mounted specimens. The color preservation is practically unlimited.

# Accidents Through Electrical Installation

By F. A. KUEPPERS
Baltimore, Maryland

THE progressive development of electrification of countries with high and low tensions which is accomplished preferably with alternating current, demands from laymen as well as from others a better understanding of the essential proceedings which take place by coming in contact with electrical installations in order to prevent accidents.

In the following, the results of scientific work in this field in connection with numerous accidents and tests which have been made on animals, are briefly given.

From tests made between 1896 and 1900, it was recognized that death caused by electricity takes a different course than, for instance, death through suffocation, hanging, and drowning.

We know today that deadly accidents do not take place as often in high tension installations as in low tension, from 50 to 60-volts, and with alternating current of a frequency of about 50 cycles.

Furthermore, it has been definitely established that if an alternating current of low tension flows lengthwise through a human or animal body, a current is created, due to the body resistance, which from 50 milli amperes upward must be looked upon as highly dangerous, and at about 100 milli amperes leads to certain death.

If we take into consideration the tendency towards illness and the difference of the body resistance, we should not apply to the human body, for alternating current electro-medical treatments, a higher intensity of current than 20 milli amperes, as anything above that may lead to unconsciousness and death. This danger line is for direct current, four to five times higher, that is at 0.4 to 0.5 amperes. If, finally, the frequency of an alternating current is increased to a high degree, then for a deadly result under the same conditions a higher voltage and current are necessary.

It is generally known that electrical vibrations of high frequency of Tesla or d'Arsonval instruments can create no physiological effect, in consequence of the inertia, because no ionic displacement within the liquid medium takes place. Low tension in passing through the organism has its greatest current density in the arteries, and therefore in the blood circulation. High tension, on the contrary, takes its course principally on the surface of the skin, and therefore causes serious burns.

The current density depends on the area of the body surface which is exposed to the current.

The physiological effect of an electrical current is different if the heart or the brain, or both, lie in the course that the current takes.

### Effects of Electrical Currents on Heart and Lungs

We shall now briefly explain the activity of the heart while in contact with a low tension.

Figs. 1 and 2 show oscillographic exposures of the blood pressure and the respiration of a dog, exposed to alternating current, and the duration of time.

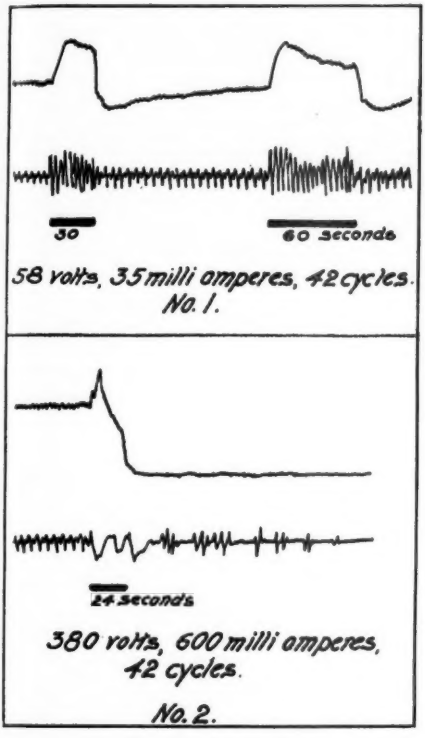
The electrical contact was made to the front paw and to the hind paw, so that the passage of the current affected the heart.

The voltage was 58 volts alternating current and 42 cycles. The circuit was turned on the first time for 32 and the second time for 60 seconds, with an intensity of current of 35 milli amperes.

The upper curve shows the heart action and the lower one the respiration. As we

notice, the blood pressure rises at each contact. The heart is continually beating, only the respiration increases. After disconnecting the current, the normal blood pressure and the respiration return. Therefore, the animal survives the condition.

In Fig. 2 the voltage was increased to




380 volts, while the current rose to 600 milli amperes.

As it is seen, during the connection the heart action ceases, and therefore the blood pressure drops below normal; while the respiration in the lower curve is interrupted, but returns after a few seconds. When the circuit was disconnected, the respiration became irregular and finally ceased entirely, as the heart had already stopped beating.

This proceeding is not so often found in cold blooded animals and small rodents. In all greater animals, such as dogs and horses and, unfortunately, also in human beings, it is not possible, in this case, to revive the heart action through artificial methods, such as artificial respiration.

The conclusion of this is, that for the physiological effect of an electrical current, not the voltage, but the intensity of the current is decisive.

### How Can We Recognize a Danger in Time?

If electricity of a city or country line comes in contact with the ground which has the potential zero, the two confronted voltages, according to the resistance of the medium, try to equalize themselves by sending a current from the higher voltage through the medium to the ground and back to the power station. If this medium is, for instance, a human or animal body, according to circumstances, the effect takes place as in illustration 1 or 2.

In general, it can be said that these accidents do not happen very often to the public, as wooden floors, or other non-conductors, give enough safety, as long as the body does not come in contact with the ground at the same time, or touches grounded metallic parts.

An interesting case is shown in Fig. 5, which indicates a cow-house with electric light from a country line. The cow is fastened to the crib by means of a chain.

Suppose the column is of steel or concrete and the electrical installation has a defect indicated by the arrow. A current flows, as dotted line indicates, through the column to the crib and then through the chain and the body of the cow to the ground. In this case sudden death is certain, as shown in Fig. No. 2. This accident is not rare.

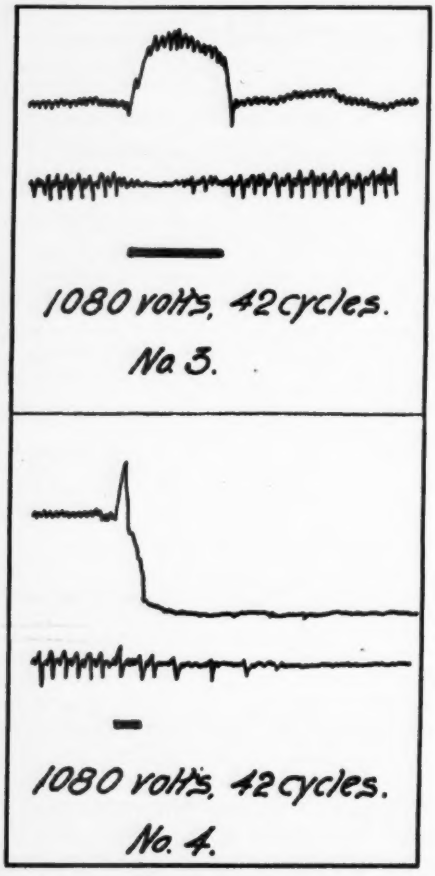
### Effect of Electric Currents on the Brain

If the brain lies in the course of an electrical current and we apply about 40 milli amperes, unconsciousness follows, and with it a spasm-like contraction of the muscles. This anesthesia is of short duration and painless. In tests on animals it has been proved that a current of one

milli ampere causes spasm, but never injures the brain.

Fig. 3 shows the heart action and the respiration of an animal, where an electric current is applied to the head only, so that the brain is affected. The upper curve shows the heart action and the lower one the respiration.

At 1,085 volts and 42 cycles alternating current, the blood pressure rises and respiration ceases, but the heart continues




beating. After disconnection, a normal condition of the heart and respiration returns.

Fig. 4 shows, if the animal is exposed to the same voltage, but the heart lies in the course of the current. Just as already shown in Fig. 2, the heart stops entirely and does not recover. Death ensues after five seconds.

This experience has led to a new way of making animals unconscious before being slaughtered.

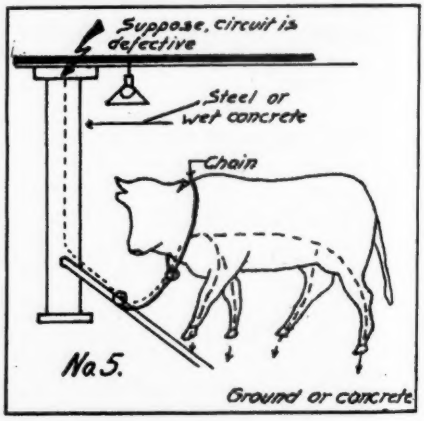
With a voltage of 70 volts alternating current from a special transformer and several milli amperes, one electrode is fastened to the neck and the other one underneath the chin of the animal.

The anesthesia follows like lightning. After 12 seconds the spasm-like condition turns into a trembling; then the current is disconnected, and the animal can be slaughtered, as the anesthesia lasts about five minutes. The bleeding is better here than by any other anesthetic method, because, as in Fig. 3, the heart continues beating.

**Electrical Anesthesia in Slaughtering Animals for Food**

Through this method annually over 40 million pigs are rendered unconscious before being slaughtered, and in no case has the animal died during the anesthesia.

In connection with this, it is desirable




to know something about the electric prods used in abattoirs.

These instruments are connected either with the usual 110 or 220 volt circuits alternating current by means of a special transformer, which reduces the voltage to about 6 volts, or they are run by batteries

of the same voltage. These 6 volts are harmless.

The electric cautery used in considerable extent by veterinarians has the same transformer construction for alternating current. The cautery operates with about 3 volts, which are not dangerous.

If the place has direct current, the cautery should have a special battery, to prevent accidents.

**Summary**

The diagrams show clearly that in case of electrical death first the heart and then the respiration stops. All efforts, therefore, to resuscitate must be directed towards a speedy revival of the blood circulation.

In death through suffocation, first the respiration ceases, and then the heart fails. Efforts at resuscitation in such cases must work to enrich the blood circulation with oxygen.

Out of these tests a new way has been found of making animals unconscious before being slaughtered.

* * * *

# Fatal Anaphylaxis in Horse Caused By Sterile Milk

I have been using a commercially prepared sterile milk in the treatment of periodic ophthalmia for some time and the results have heretofore appeared to be as satisfactory as with any other treatment. The dose given has varied from 15cc to 30cc depending on the size of the horse. The injections were given five to seven days apart.

July 7, I divided a 50cc bottle of sterile milk between three horses on the same farm, giving an 1,800 lb. horse 20cc and 15cc to each of the others, their weight being about 1,500 lbs.; this same treatment was repeated on July 13, and again on July 20. The last horse to receive an injection died within two minutes. The 15cc injection of sterile milk was, on this occasion as on both previous occasions, injected into the pectoral muscles.

The large horse was led out of the stable and given 20cc and replaced in his stall; the second one was brought out and treated and returned; the third one was brought out and given 15cc and returned to his stall and the attendant had hardly finished tying her when she reared back and fell against the side of the stall and continued to stagger from side to side until she went down in about 15 to 20 seconds. I gave her 8cc of epinephrin solution as soon as possible but she died promptly with typical symptoms of anaphylaxis.

The two other horses started eating hay immediately and remained entirely normal. There had been no reaction in any of the three horses from either of the previous injections. The milk used in the first injection was prepared by one laboratory; that for the second and third injections by another. No other treatment was given during the two-week period except an eye ointment.

This fatality has made me hesitant about using foreign proteins and I am wondering if the danger may extend to colloidal carbon which I have been using to some extent for various conditions.

C. M. Grubb.

Rockville, Md.

*Comment.* — Although an anaphylaxis from the use of sterile milk seems to be rather rare, there is no apparent reason why such should be the case. It is not difficult to produce a hypersensitiveness or an anaphylaxis in guinea pigs by the use of sterile milk. In other words, the casein is a protein, which, like other foreign proteins, will produce an anaphylaxis. It is unusual for a case to develop as indicated in this report. To begin with, the doses were relatively large and given at relatively short intervals. If, for example, the second injection had been 30 to 60 days, after the first injection, a reaction would have been more likely in the usual course.

A second peculiarity in this report is the short time elapsing between the injection, the appearance of symptoms and

death. As a rule, an anaphylactic shock does not become evident under fifteen minutes and from that to half an hour and occasionally longer. This would indicate the injection or part of the injection was direct into a blood vessel in the pectoral muscle.

Not long since, a man was given an injection of sterile milk by a physician in Kansas City. There was a delayed reaction, the shock occurring some eight or nine hours after the injection, and the man died. The physician is now being sued for damages.—A. T. K.

*Comment:* In discussing this report with several clinicians, it was the consensus of opinion that this was a case of anaphylaxis, although only one consulted had ever seen a true case of anaphylaxis in the horse. This was a case of a second injection of some antiserum either of equine or bovine origin. A question of importance in the case report submitted would be as to whether the horse had at some previous time had an injection of sterile milk. With our increasing knowledge of allergic reactions of one kind and another, it seems to be the opinion that anaphylaxis occurs more commonly in the various lower animals than has been thought. It is my understanding that physicians are reporting cases of anaphylaxis brought on by injections of sterile milk in humans, and there has been the tendency to discontinue the use of sterile milk and to substitute purified milk protein. I learned recently of a human death due to sterile milk injection. So while unusual, there is the possibility of serious reaction. There seems to be no reason for assuming that the horse is entirely insusceptible to anaphylaxis due to sterile milk, particularly as evidences of other types of allergic reactions are quite commonly noticed in the horse. The symptoms described in this case report are certainly typical for anaphylaxis.

Regarding the reference to colloidal carbon in the report. While the intravenous injection of colloidal carbon is with the purpose of producing a reaction, anaphylactoid in character, there should be no special danger associated with its use as with foreign proteins.—H. D. B.

*Comment:* See also abstract No. 92 in this issue, in which milk is recommended as a preventive of anaphylaxis. Possibly it is this property of milk that accounts for the rarity of anaphylaxis following repeated injection of sterile milk.

* * * *

## Equine Influenza

This ailment is also known as catarrhal fever, pink-eye and epizootic cellulitis, shipping fever, etc. It is highly contagious and infectious and usually localizes in the respiratory tract and sometimes in the mucosa of the digestive tract. The disease is widely distributed and prevalent wherever susceptible animals are assembled in numbers such as at remount depots, stock-yards and sale stables. Complications are common.

*Etiology.*—Little is known of the cause of equine influenza. The virus of influenza has been confused with that of contagious equine pneumonia. Following subcutaneous injection of the virus, investigators find the period of incubation to be from two to six days. This virus is found in most of the body fluids and in the blood and remains there indefinitely. Infected animals spread the disease readily, as will also the objects which they have come in contact with them. The infection will apparently die out in infected premises, in the absence of susceptible animals. One attack is supposed to confer permanent immunity.

*Morbid Anatomy.*—Death may result from circulatory failure, pneumonia, enteritis. Lymph glands and large body glands show petechial hemorrhages, there is degeneration of the heart, liver, kidneys and muscle. Lungs show hyperemia and edema and the digestive mucosa may be hemorrhagic and hyperemic.

*Symptoms.*—This disease is usually manifested by complete loss of appetite, chills, congested or jaundiced conjunc-

tival, rapid respiration, restlessness and creaking of joints. Temperature 103° to 106° F., which usually continues for three days; it may drop suddenly to normal. The disease is characterized by the uneven distribution of the external temperatures. Apparently healthy horses which show high temperatures and are among infected ones is a valuable aid in diagnosis.

There exists a stupor or great nervous depression with the high temperature. Tremors appear in the legs and body and occasionally paralysis appears. The gastric symptoms are an essential part of this disease. The mucous membranes of the mouth are hot and congested. When the inflammation extends to the pharynx there is difficulty in swallowing. Colics sometimes occur and constipation may be present. Later on this constipation changes to a diarrhea. There is a suppression of peristaltic action and the abdomen is painful on pressure.

Epizootic Cellulitis or pink-eye is considered by some writers to be a complication of influenza while others regard it an independent disease. The writer has seen many cases occur in outbreaks of influenza and considers it a complication. Pregnant mares abort, stallions become affected with orchitis, and lesions of the eyes develop. It is marked by edema of the sub-cutis of the legs, ventral parts of the body and the eye-lids.

Other complications are paralysis due to lesions of the brain and spinal cord, nephritis, swelling of joints and tendon sheaths, laminitis, digestive disturbances, urticaria, influenza pneumonia and muscle cramps.

In uncomplicated cases the temperature will usually drop to normal in about three days. Recovery takes place in one to two weeks. Mortality is estimated at about one per cent.

*Treatment.*—Treatment of this disease is principally symptomatic. Neo-Salvarsan is considered a specific by some, but to be effective it must be used within the first three days of the disease, before organic changes have taken place. Equine influenza bacterins are of value in both treatment and prevention of this disease. Blood transfusions are of great value. Five hundred cubic centimeters of blood taken from a horse recently recovered from influenza and injected into the affected animal is most beneficial. Antihemorrhagic septicemia serum, previous to shipment, is recommended as a prophylactic against influenza. Hemorrhagic septicemia aggressin in 5cc doses is recommended by Marshall and Lee as a valuable immunizing agent. Sodium cacodylate intravenously is valuable when repeated every other day. Camphorated oil is useful in circulatory weakness. For prostration use strychnine sulphate, one-half grain three times daily. For affections of the pharynx use expectorants. For diarrhea which sometimes appears use bismuth subnitrate or sulpho-carbolates. When there is constipation great care must be taken that drastic purgatives be not used. Aloin is contra-indicated. Udall recommends sodium sulphate, one to two ounces daily in an electuary.

Sanitation is very necessary in the successful handling of this disease. The sick must be removed from the well. They should be protected from cold, moisture and drafts at all times. Water should be brought to them and all utensils and feed boxes thoroughly cleaned and disinfected every day.

Geo. E. Bartholomees.

Sheldon, Mo.

* * * *

**Bio-Hormonal Diagnosis of Pregnancy**

The ovarial hormone "folliculin" is demonstrable in the caprine urine at about the time when the goat enters the last third of the gestation period.[83]. At about the same time the diagnosis of pregnancy can be made quite accurately by clinical examination. Thus, the biohormonal method loses much of its value.

[83] Küst and Vogt 1934. Nachweis der Sexualhormone bei der iege und ihre Auswertungsmöglichkeit für die hormonale Trächtigkeitsfeststellung. (Hormonal pregnancy in goats). *Tierärztliche Rundschau* 40(34):589-591. Abst. by F. Volkmar.

# Some Swine Problems*

By A. T. KINSLEY,
Kansas City, Missouri

THE swine industry is in a rather chaotic condition at this time because of climatic conditions and the application of artificial methods in the attempt to regulate production. Was the pig and sow slaughter program during the fall of 1933 and the application of the processing tax beneficial for the producer, processor or consumer? What will be the result on the market price of swine, and future production when and if the processing tax is discontinued? These are questions, the answer of which will have a tremendous bearing on the immediate future of the swine industry.

It should not be assumed that the swine diseases that are not given consideration in the following discussion are not of importance. Thus, hog cholera and infectious necrotic enteritis are two of the most important diseases of swine and will receive no further mention.

Three diseases of swine, anthrax, erysipelas and sarcoptic mange, should be of interest at this time because of the occurrence of those maladies in certain drought areas and the movement of swine from those areas.

## Anthrax

*Occurrence.*—Swine are, as a rule, more resistant to anthrax infection than other domestic animals, and for this reason this disease in swine is usually evidenced by local lesions that develop at or near the point of infection rather than by systemic infection and septicemia.

*Source.*—The principal source of anthrax infection in swine is from the consumption of anthrax carcasses.

*Symptoms.*—The usual symptoms in swine affected with local anthrax consist of a rise of temperature and an edema of the subcutaneous tissue of the guttural region, thus causing difficulty in respiration and deglutition. There may or may not be a bloody diarrhea.

In septicemic cases, the usual symptoms are high temperature, extreme prostration, inappetence and death within one or two days.

*Lesions.*—The primary lesions of local anthrax in the usual form in swine occurs adjacent to the pharyngeal cavity and in the intestine. The tonsil appears to be the usual channel of entrance of bacilli; however, the infection may gain entrance through other avenues in the mouth. As a rule, only one tonsil is involved. The lesions consist of hemorrhagic inflammation which usually persists until the affected tonsil is practically destroyed and becomes necrotic. The necrotic areas appear dry and brown to yellowish gray in color. The tissue surrounding the localized lesions is usually studded with petechia and may be infiltrated with a fibrinous exudate.

The intestinal infection most frequently involves the duodenum in which the lesions are variable. There may be numerous individual diseased foci in the intestinal mucosa, or the entire mucous membrane may evidence hemorrhagic inflammation with a tendency to necrosis. As a rule, the related intestinal lymph glands are involved. These glands are usually edematous and hemorrhagic and may undergo necrosis. Necrotic lymph glands are in the earlier stages of a brownish-green color and may later become greenish or yellowish in color.

Sloughing of the necrotic areas of the intestinal mucosa may result in ulceration. The intestinal content is usually bloody and in an occasional case ulceration results in perforation of the bowel wall and a sequential peritonitis. Similar lesions may

*Presented at the Semi-annual Meeting of the Minnesota Veterinary Medical Association, July 5-6, 1934.

be found in the large intestine. The omentum adjacent to the involved intestine is usually hemorrhagic and edematous. Varying quantities of bloody fluid may be found in the peritoneal cavity. According to Marek, the lesions of the related regional lymph glands are pathognomonic. They are hyperemic, hemorrhagic and necrotic. In the earlier stages of the disease, the lymph glands are usually tumefied and later they become hemorrhagic. In the subacute or chronic cases small hemorrhagic foci are noted in the lymph glands. Should the animal recover, the necrotic foci in the lymph glands becomes encapsulated and if the necrotic areas involve the major portion of the gland, the entire gland becomes encapsulated.

The septicemic type of the disease in swine is manifested by tumefaction of the spleen with or without development of carbuncles within or upon the spleen. The color of the spleen is bluish red or dark red and the pulp becomes semi-liquid and dark in color. The splenic carbuncle is the result of hemorrhagic inflammation and necrosis. Further evidence of the septicemic type of the disease consists of hemorrhages in the heart, kidney and serous membrane. The liver is usually congested and tumefied and it may contain small necrotic foci. The lung may evidence hemorrhagic inflammation and necrosis and there is usually a fibrinous pleurisy. The blood is black and tarry and not readily coagulable.

Anthrax of the septicemic type may be confused with hemorrhagic septicemia, hog cholera and acute erysipelas.

*Differential Diagnosis.*—Hog cholera is essentially a septicemia and all affected swine will evidence similar symptoms, whereas in anthrax some of the affected swine will show local guttural affection. The lymph glands in cholera frequently show a sub-pericapsular hemorrhage, but the glands do not become necrotic as they do in anthrax. Cholera blood coagulates regularly.

Hemorrhagic septicemia is characterized by petechial hemorrhages in serous and mucous membranes and the parenchymatous organs. The lymph glands are usually edematous, slightly tumefied and may be hyperemic and hemorrhagic, but they do not become necrotic. The blood coagulates readily. Further, hemorrhagic septicemia is not as rapidly fatal as is anthrax.

Septicemic erysipelas is manifested by hyperemia of the conjunctival mucosa. Food may be found in the stomach and there may be scarlet red areas in the gastric mucosa. There is usually paint brush hemorrhages on the serous coat of the stomach. The small intestine may evidence hemorrhagic inflammation. The large intestine usually contains numerous small hemorrhages and the walls may be edematous. The spleen is usually bright red, hyperemic and slightly tumefied. There is usually hemorrhage in the heart and a diffuse nephritis is common.

Intestinal anthrax may be confused with swine erysipelas, infectious necrotic enteritis and possibly with some types of mineral poisoning. Intestinal swine erysipelas is associated with hemorrhagic gastro-enteritis and although the related lymph glands may become edematous and hyperemic in erysipelas, they rarely ever become necrotic. There is no carbuncular involvement of the spleen in intestinal erysipelas.

Inflammation of varying intensity of the diphtheritic type characterizes infectious necrotic enteritis. This type of lesion does not occur in swine erysipelas. Infectious necrotic enteritis is usually largely confined to the large intestine and enteritis associated with erysipelas usually occurs in the small intestine.

Swine rarely contract anthrax, even on premises where anthrax infection prevails, excepting when they have access to the discharges of cases of anthrax or eat of the carcasses of animals dead of the disease.

It may, under certain conditions, be advisable to resort to protective vaccination of swine. The movement of swine

from infected premises should require careful veterinary inspection and dipping prior to shipping.

### Swine Erysipelas

Swine erysipelas is a disease primarily of swine and caused by *B. erysipelatis suis.*

*History.*—This disease was recognized in Europe about fifty years ago. A mild form of the disease usually designated as diamond skin disease has been recognized in the United tates for the past twenty-five or thirty years. The causative organism of swine erysipelas was first isolated and identified in this country by Creech of the B.A.I. in 1921. The acute type of the disease occurred in South Dakota in 1929.

*Occurrence.*—Swine erysipelas prevails throughout Europe and in this country it has been identified in practically every state in the corn belt.

*Susceptible Animals.* — Although swine erysipelas is primarily an affection of swine, the causative microbian agent has been isolated and identified in cattle, lambs, goats and the human. Swine ranging in age from three to five or six months are most susceptible; however, swine of any age may become infected. This disease is more prevalent during the warm summer months, only occasional cases being observed during cold weather.

**CHRONIC ERYSIPELAS IN PIGS**

**There was no death loss in this herd but the pigs had swollen joints, were lame, unthrifty and unprofitable to the owner.**

*Cause.* — The causative microbe, *B. erysipelatis suis,* is a slender straight or slightly bent non-motile organism, is Gram positive and does not form spores. This organism appears to be capable of withstanding climatic changes and persisting in soils on farms where the infection has once occurred. Instances have been recorded in which swine erysipelas occurred on a farm after which all the hogs were marketed and other hogs from premises where the disease had not previously existed have been placed on the infected farm and later showed evidence of the disease. Swine erysipelas frequently occurs in mild or chronic form, during which time the infected animals are apparently capable of transmitting infection. Whether or not otherwise healthy animals act as carriers, has not been demonstrated.

*Avenue of Entrance.*—Natural infection appears to occur primarily through the digestive tract and secondarily through the skin.

*Incubation.*—Although the period of incubation of infected animals such as pigeons and mice is relatively short, the length of time between infection and evidence of symptoms in swine is very variable. The introduction of a shote affected with chronic erysipelas into a healthy herd provides infection, but not infrequently the disease will not appear in the exposed animals for a period of from one week to several months.

*Types.*—According to the susceptibility of animals and the virulency of the organisms, there are at least two types of the disease, namely: acute, or the septicemic type, and a chronic localized type.

*Lesions.*—Acute or septicemic swine erysipelas is manifested by hyperemia of the conjunctival mucosa. There may or may not be a purplish discoloration of the skin on the venter surface of the abdomen. The lymph glands will be tumefied. The stomach may contain food and the gastric mucosa may show scarlet red areas. The small intestine may evidence hem-

orrhagic inflammation. The large intestine usually contains numerous small hemorrhages and the walls may be edematous. There is usually a diffuse nephritis. The spleen is usually bright red, hyperemic and slightly tumefied and there are hemorrhages in the heart.

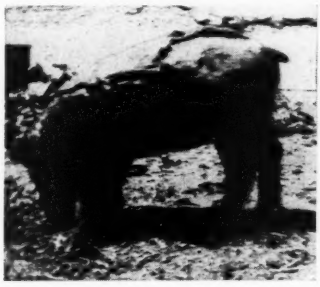
The lesions of the mild or chronic form of swine erysipelas consist of: (1) Diamond skin disease, a diffuse dermatitis of varying intensity. The involved skin may later become necrotic and slough. (2) Arthritis involving stifle hock, tarsal and carpal joints, the frequency of involvement probably in the order mentioned. Joint lesions vary from a mild inflammatory disorder in which the synovial membrane is slightly congested and the synovial fluid cloudy to a chronic proliferation in which the synovial fluid contains flocculi and the joints are more or less deformed because of the proliferative fibrous tissue. (3) Related lymph glands, enlarged and edematous, may or may not be hyperemic. (4) Vegetative endocarditis in which the valves of the heart are covered with a cauliflower-like deposit of fibrin.

The skin lesions are frequently observed by the practitioner in the live hog and the joint lesions may be observed. The skin and joint lesions may occur singular or in various combinations. Again, the skin lesions alone may be observed in one hog, the joint lesions in another. In a more severe type of the chronic form of the disease, there is swelling and later sloughing of the ear, tail and feet.

*Symptoms.*—The septicemic form of the disease has a sudden onset. The affected animal is indifferent, usually refuses to eat, retches frequently and may vomit; has high temperature and may evidence disturbance of the cerebral functions. There is marked weakness and a tendency to incoordination in the hindleg. The conjunctival mucosa may be congested and the eyelids swollen. There may be grinding of the teeth, and diarrhea is usually present. This form of the disease runs a rapid course and is usually fatal.

The symptoms of the mild form of the disease are indefinite. There may be cutaneous erythema (diamond skin disease) skin sloughing, lameness, enlarged joints, sloughing of the ears, tail or feet.

*Avenues of Elimination.*—The erysipelas



**Skin Form of Swine Erysipelas.**

organism is eliminated in the feces and probably in other discharges from an animal affected with the septicemic type of the disease. The microbe may also be eliminated from hogs affected with the chronic type of the disease from the skin and from sloughed tail or feet.

*Course and Prognosis.*—The septicemia type of erysipelas runs a course terminating in death usually in from one to three days. The course of the chronic type of the disease is variable. The animal may survive and ultimately die of other causes or be slaughtered. Prognosis in the septicemia type is always unfavorable, and a varied prognosis should be given of those affected with the chronic type of the disease.

*Diagnosis.*—Swine erysipelas of the septicemic type may be confused with anthrax, hog cholera and hemorrhagic septicemia. The chronic form of swine erysipelas may be confused with dermatitis, caused by high or low temperature and chronic arthritis.

In the septicemia type of anthrax, the spleen is tumefied and may contain the so-called carbuncles and the lymph glands show hemorrhages and necrosis, whereas in the septicemic type of swine

erysipelas the spleen is usually not enlarged and contains no carbuncles, and the lymph glands although edematous and swollen may be hyperemic but rarely are they hemorrhagic, and they do not become necrotic.

Uncomplicated hog cholera is characterized by petechial hemorrhages into the mucous and serous membranes and usually also in the kidney. The lymph glands are only slightly tumefied, and not infrequently show a pericapsular hemorrhage. In addition to the hemorrhage and lymph gland lesions of swine erysipelas, there is usually a hemorrhagic gastro-enteritis and in many instances there is a hemorrhage in the gastric wall that gives the appearance of a paint brush stroke. These lesions, that is the gastro-enteritis and particularly hemorrhages in the stomach suffice to differentiate septicemic erysipelas from hemorrhagic septicemia.

Infectious necrotic enteritis is characterized by an inflammation of the intestinal mucosa of varying intensity but in which there is usually a diphtheritic exudate, a type of lesion that does not occur in swine erysipelas. Swine erysipelas usually involves the small intestine and infectious necrotic enteritis and the large intestine.

Cutaneous erysipelas, that is diamond skin disease, is differentiated from other types of dermatitis because of the peculiar diamond shape of the lesion. Erysipelas skin sloughs are usually definitely circumscribed, a peculiarity sufficiently distinct to differentiate erysipelas from local freezing or burning. Articular enteritis probably can not be distinguished from other types of arthritis without laboratory tests.

*Control.*—Treatment of swine affected with the acute type of this disease by the use of erysipelas serum will produce variable results, depending upon the stage of the development of the disease in the treated animals. The use of serum will give a temporary immunity only and may not be entirely satisfactory in controlling the disease on infected premises. The treatment of chronic cases is of little value.

This disease is of sufficient importance that definite rules and regulations should be instituted by all state regulatory officials, to prevent spread and dissemination of the disease. Numerous instances of swine erysipelas in herds in Missouri, Iowa, Nebraska, and Kansas, have been traced to shipments of hogs from infected areas in other states. Swine erysipelas is far more difficult to control than hog cholera and the infection persists on a farm that once becomes infected for an indefinite period of time.

### Sarcoptic Mange in Swine

Until fifteen or twenty years ago, sarcoptic mange in swine was not of common occurrence in the Corn Belt States. About fifteen years ago, the disease apparently became quite widespread, particularly in South Dakota and the disease now occurs in all corn belt states, at least as far east as the Mississippi River. It was ascertained in 1923 by a packer that sarcoptic mange in swine was costing the producer at least 60 cents for every hog sold for slaughter.

There is an additional loss to the producer of swine because the affected animals become unthrifty and require an additional quantity of feed to get them ready for market. It was estimated in 1923 that 40% of the hogs slaughtered during the winter months from one state showed evidence of the mange mite, the damage being variable, some hogs showed only a slight effect and others evidenced extreme infestation in which the skin was condemned as unfit for food. The loss in pork products due to this condition in one packing house amounted to over $300,000 during the winter and early spring months of 1923. The disease is more prevalent now than it was in 1923.

*Cause.*—The cause of this malady is the *Sarcoptes scaebi* var *suis*. This parasite rarely invades other hosts and usually does not survive for any length of time

except on swine. The disease is contagious; that is, contact is sufficient to permit the passage of parasites from infested to non-infested swine. By this means, all swine in a lot usually become infested with mange once the parasite is introduced into the herd. The disease is most prevalent in the winter when the animals are housed and kept in close contact. Mange is usually carried from one herd or flock of animals to another or from one farm to another by infected animals. Mange was spread to 76 different farms in one of the northern states by breeding swine sold at one public auction.

*Symptoms.*—Mange is a parasitic dermatitis manifested by an intense pruritis. Parasites usually first invade the soft skin in and around the eyes and ears and then gradually extend to various parts of the body. The parasites burrow into the dermis producing papules that later become vesicles, the vesicles rupture and the fluid in varying quantities dries forming scabs, the extent of which will depend upon the accessability of the part to rubbing. There is usually more or less falling of bristles as the disease progresses, the skin becomes scurvy-like, thick and wrinkled, and frequently contains deep crevices or rhagades. Although the disease may occur at first in only one animal in the lot, it usually spreads until all animals in the same lot are affected.

The principal damage done by this parasite is in the skin, although the constant irritation results in unthriftiness and the animal frequently becomes very thin and weak and its susceptibility to other diseases is increased.

*Lesions.*—The lesions produced by the sarcoptes mites are confined to the skin. The parasite obtains tissue juice by pricking the skin with its stylette. This injury produces erythema and infiltration which is succeeded by vesicular formation, later the vesicles may or may not rupture. The fluid becomes dry, thus forming a scab beneath which the parasites are found. Galleries are formed within the skin, particularly by the female parasite and this adds to the irritation. The accumulated dry scab breaks and damages the bristles, thus leaving the affected part hairless. The continuous irritation produces an inflammation associated with fibrinous proliferation and thus the skin becomes thickened, loses its pliability and frequently becomes cracked.

*Treatment.*—Mange in swine is not difficult to treat, providing the life cycle of the parasite is taken into consideration. This condition can be most effectively controlled by dipping. If a dipping vat is not available, hog wallows may be medicated or hand application may be employed. According to Schwartz, crude petroleum is the only dip that is known to eliminate both lice and mange with one dipping, and is moreover the most effective and most economical dip for these external parasites. Lime and sulphur dip is less effective than is petroleum, and if lime and sulphur dip is used there must be at least four dippings about one week apart. The hog houses, and the rubbing posts, must be treated at the same time the swine are dipped, otherwise, there will be reinfestation. Unfortunately, this disease is usually not treated because of the fact that it does not cause death and the feeder is not aware of the damage resulting from the parasite.

Although the prevalence of this disease was given publicity ten years ago with the idea that perhaps efforts would be made to prevent the spread of the malady, little has been done to control its spread. There should be rigid regulations instituted governing the shipment of hogs from infested territories. It would seem justifiable that there should be a veterinary inspection of all breeding and feeder hogs whether they are shipped intrastate or interstate, and all hogs found to be affected with mange should be prohibited from shipment until they are known to be free from the parasite that produces the disease.

# Hemorrhagica Septicemia*

By CHARLES LINCH, Albany, N. Y.
Asst. Director Bureau of Animal Industry, N. Y. S. Dept. of Agriculture and Markets

HEMORRHAGICA Septicemia is an acute, sub-acute or chronic infection which affects several species of domestic animals. It is widespread throughout the United States and is prevalent among cattle and sheep, although it may attack swine, goats, horses, dogs, cats, rabbits and other animals. Wild animals are susceptible and may be responsible for the spread to domestic animals. In cattle one form of the disease is called shipping or stock yard fever, in hogs, it is known as swine plague, and when attacking poultry, it is known as fowl cholera.

The causative germ is widely distributed in nature, being found in the soil, in stagnant water, on various plants and even on the mucous membranes of normal animals. Under certain conditions the germs become virulent and attack the healthy tissues. When they enter the circulation, they multiply with great rapidity, causing death from blood poisoning.

Any condition which lowers the vitality of the animal and thereby lowers the resisting forces of the body, makes the animal more susceptible to disease. Therefore, spread of the disease depends largly upon the condition and susceptibility of the animal at the time of exposure. The following are predisposing causes: Exhaustion from long journeys by rail, truck or boat, especially during cold or rainy weather; lack of proper food, water and exercise; exposure to extreme heat; crowded conditions together with lack of ventilation; excitement, violent exertion, colds, anemia and parasites.

Sporadic outbreaks of hemorrhagica septicemia may occur in native or thoroughly acclimatized animals that are in good condition and have not been subjected to shipping or adverse weather conditions.

*Radio address, Aug. 24, 1934.

The disease occurs in different forms, depending somewhat upon the susceptibility of the animal. When the infection is severe, it may occur in the very acute form, the animal dying in from twelve to twenty-four hours. When it is less severe, the attack comes on more slowly and the animal does not die so quickly or may recover. Many cases assume the chronic form, which may last for weeks or even months. Chronic cases have a persistent cough and show great emaciation and may show swelling of the joints.

The incubation period is quite short, usually from one to three days. The onset of the disease is sudden, its course rapid and the termination often fatal. Unless they are given proper treatment, a high percentage of the affected animals may die—those that recover often remain unthrifty.

The chief losses are found to result from the transportation of cattle during the fall and winter. Animals shipped may be sick upon arrival or they may come down with the disease shortly after arrival and cause losses by infecting susceptible animals in herds to which they are added. Losses may also be sustained as the result of cattle exhibited at fairs or in the case of auction sales. Such exhibited or sale cattle may come down with the disease after they are returned to the farm. Losses are greater among young animals, especially if thin in flesh and poorly nourished, the older ones probably having acquired a certain amount of immunity from earlier, mild, unnoted attacks.

The symptoms in cattle may vary according to location of the disease—that is, whether of the respiratory or digestive type. The most noticeable symptoms

are a rise in temperature, which may be from 103° to 107° F., quickened pulse, lack or loss of appetite and dullness; stiffness, drooping of ears, swelling of the head, neck and legs, and, in cows, suspension of milk secretion. With the respiratory form, there may be a dry, painful cough and difficult and rapid breathing, also discharge from the nose, which may be mistaken for non-specific pneumonia. With the intestinal form, there may be colicky pains and intestinal disturbances. Mild cases may show no symptoms other than a slight rise of temperature.

In the case of an outbreak, all healthy animals should be removed from the infected ones and placed in thoroughly cleaned and disinfected quarters and their temperatures taken daily to detect any new cases. A knowledge of the cause of the disease together with proper immunization, isolation of infected animals, proper disposal of animals dying from the disease and thorough disinfection of premises have reduced losses greatly in the past. Losses may be prevented to a large degree by proper handling before shipment, viz., by avoiding hard driving and overcrowding, and by feeding and watering regularly and allowing time for rest.

It has been proved that animals may be protected from contracting the disease by proper immunization before shipment. Therefore, dealers of cattle and others, who are moving cattle long distances, either by rail, truck, boat or are driving them, should have the animals vaccinated against shipping fever before starting. There are several products used quite extensively for immunization, viz., aggressin, bacterin, vaccine and serum. It is believed that the best results are obtained by vaccinating the animals intended for shipment with either aggressin or bacterin, at least 10 to 14 days before they are moved from the home farm. These products are considered quite safe, as neither contain living organisms. It has been proved, however, that animals vaccinated with these products are more susceptible to the disease for several days after vaccination than unvaccinated animals and that resistance does not become fully established for from 10 to 14 days. Therefore, it increases the probability of the disease to vaccinate animals immediately before, during or immediately after shipment. The immunity conveyed by those products may last a year or more.

When immunity is desired within a short time after administration—that is, when the animals are to be shipped shortly after treatment, serum should be used. Inasmuch as the immunity conveyed by serum is but of a few weeks' duration, bacterin may be administered after their arrival, as a further precaution. It is advisable to isolate any recently imported animals from the herd, for a couple of weeks, take their temperatures daily and observe if any symptoms of disease are shown. When purchasing cattle that have been shipped without preventive treatment, they should be given a large dose of serum after arrival.

Serum may be administered to healthy animals that are in immediate contact with the disease or cattle intended for shipment shortly after treatment, also to healthy animals in herds to which recently imported cattle have been placed.

In addition to treatment of the most pronounced symptoms, large doses of serum are indicated. Very often treatment of well-advanced cases proves unsatisfactory.

When cattle are to be exhibited at fairs, it is recommended that they be protected against septicemia hemorrhagica by immunization, before leaving the home farm. In the case of cattle going on a show circuit, where they may be months on the road, one of the products giving an immunity of longer duration—bacterin or aggressin should be used. This should be administered from 10 to 14 days before shipment. In case this

has been neglected, a dose of serum may be given before starting and later, if desired, one of the products giving an immunity of longer duration may be administered. If the cattle are to be exhibited at only one or two fairs and an immunity of only a few weeks is desired, the serum is probably sufficient.

The carcasses of animals dying from hemorrhagic septicemia should be buried deeply. When they die in the stable or if the disease has existed on the premises, the stables and premises should be thoroughly cleaned and disinfected.

* * * *

## Do You Remember?

1, Question. What is the Schilling hemogram?

Answer. The Schilling hemogram is a tabulation of the kind and ratio of leucocytes in the blood, as devised by Schilling. It is useful in determining the presence and sometimes the stage and severity of infections.

2, Q. Do muscles increase in size during contraction?

A. No; although the diameter becomes greater, the muscle becomes proportionately shorter; the volume remains the same.

3, Q. Differentiate between rennin and renin.

A. Rennin is a ferment which curdles milk, while renin is a kidney extract.

4, Q. What is lyssa?

A. Lyssa is another name for rabies, or hydrophobia; it is also called lytta.

5, Q. Which vitamin is most abundant in (a) yeast; (b) butter; (c) oil of wheat embryo; (d) haliver oil; and (e) citrus fruits?

A. In (a) yeast, vitamin B is most plentiful; in (b) butter, vitamin A; in (c) oil of wheat embryo, vitamin E; in (d) haliver oil, vitamin D; and in (e) citrus fruits, vitamin C.

Wesley O. Keefer.

Akron, Ohio.

## Pyelonephritis

A disease which is yearly becoming of greater importance to the veterinarians and which should be better understood is pyelonephritis of cattle. Because recoveries seldom or never occur, it is highly important that the disease be diagnosed early and the owner advised to remove the affected animal from the herd.

An indication of its importance may be gained from the increased frequency of occurrence as noticed in the Ambulatory clinic of the New York State Veterinary College. According to Udall,[1] from 1915 to 1924 not a single case was diagnosed. In the eight-year period from 1924 to 1932 thirty-four cases were recognized, and of these twelve were in 1931 and 1932. Because the symptoms are almost pathognomonic it is very probable that it had not escaped recognition during the earlier period mentioned and the increasing numbers indicate an increase in prevalence.

The disease has been observed largely in the winter months, cold weather being a factor in its virulence. Most of the cases recognized are in cattle two to seven years of age. Many have regarded the disease as secondary to pyogenic infections, especially mastitis and metritis, the infection being transmissable by way of the blood stream, but the organism responsible is unlike that of other pyogenic diseases. However, when the disease develops after a severe parturient disease it is probable that this condition was responsible for the onset of the pyelonephritis.

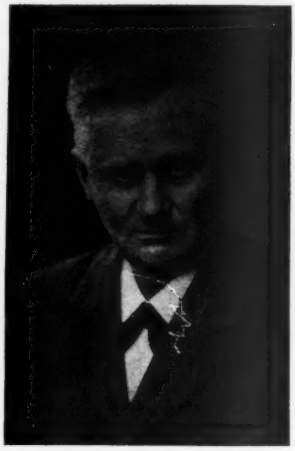
*Corynebacterium renalis*, the causative agent, is a pyogenic, Gram positive diphteroid. Jones and Little[1] of the Rockefeller Institute conclude that the organisms are found normally in the genital tract of young calves, and Ernst found it wide-spread in nature and in the vaginas of apparently normal cows.

The post-mortem changes are highly characteristic. The cow is emaciated; the bladder is thickened and hemorrhagic. One or both kidneys are greatly enlarged.

[1]Jour. Exp. Medicine, 1930, Vol. 51, page 909.

The normal lobulations often disappearing with a resulting smooth-surfaced organ. The pelvis contains a mucoid grayish or yellowish pus often mixed with blood and urine, having a characteristic odor of ammonia; and finally, in some cases lesions are found only in the bladder.

The usual history shows a severe loss of condition over a period of days or weeks. The appetite may be good, but the reduction in milk production and decrease in



PROFESSOR CARL OLUF JENSEN
1864-1934

weight is astonishing. I have seen one cow lose several hundred pounds in the course of a week! The attack is usually sudden but not always. The first symptom usually seen is the passage of bloody urine; this being almost pathognomonic of the disease, also frequent and painful urination. Examination of the urinary system shows blood, pus, and urine in the vagina. One case which I saw was diagnosed on observation of urine which was drawn to be tested for acetone bodies in the belief that the cow had acetonemia. Rectal palpation reveals enlarged kidneys with no lobulations palpable, and enlargement of the ureters with pain on pressure.

Examination of the urine shows the presence of blood clots, pus, and sometimes the organisms when a smear is made. The course is from a few days to a year and recoveries are extremely infrequent.

According to Udall[2] there is no known effective remedy for pyelonephritis. Treatment being ineffective, affected animals should be disposed of, thereby preventing the spread of the disease and great financial loss to the owner.

Utica, N. Y. Trevor H. Hughes.

## Death of Professor Jensen

Dr. Carl O. Jensen, Director of the Danish Agriculture and Veterinary School, died September 3rd, 1934, at the age of 70. Doctor Jensen was graduated from the Royal Veterinary and Agricultural High School, Copenhagen, in 1882, at the age of 18 and immediately began a country practice in Jutland. In 1884 he became assistant to Professor B. Bang in the school from which he graduated. He studied in Salmonsen's Laboratory, and in 1886 published his first paper, the subject being malignant edema. In 1887 he published a paper on the etiology of strangles. For many years he pursued bacteriological investigations with great success, being among the first two or three veterinarians to undertake bacteriological research. In 1903 he was elevated to a professorship in the Danish veterinary school. With Professor Friis, he founded the Danish Veterinary monthly *Maanedsskrift for Dyrlaeger* of which he remained joint editor until his death when it had reached the 45th year of publication. In 1890 he began teaching a course in meat and milk hygiene and in 1903 published his book, "The Essentials of Milk Hygiene," which was translated into English in 1907 and from which a whole generation of American veterinarians have learned the rudiments of the subject. His original research into the bacteria disease of calfhood, the colon-typhoid group, botryomycosis, swine erysipelas, Bradsot of sheep, and human and bovine tuberculosis added much to the available knowledge of these subjects, as did also his classical research in the cause and development of malignant tumors.

# Acetonemia in Dairy Cows

By ROBERT E. LORMORE,
Sidney Center, New York

ACETONEMIA in the dairy cow was not recognized until recently. That the disease has been present is certain, but the disease in the past has been called "milk fever," or "atypical milk fever; post-parturient paresis, etc." This is not to be wondered at when we consider that the symptoms of acetonemia so closely resemble the symptoms of certain cases of milk fever, that it is difficult to tell which is acetonemia and which is milk fever. Occasionally cases of "atypical case of milk fever," developing two or three weeks or longer after parturition have been reported. These cases usually did not respond as they should to the milk fever treatment, and are now thought to have been acetonemia.

Acetonemia is defined by Dr. Udall as, "a post parturient disease of well-nourished mature cows characterized by a marked hypoglycemia, acetonuria and acetonemia." In order to obtain a clear picture of this disease one must understand the origin and distribution of the ketone bodies. The ketone bodies, or acetone bodies, consist of acetone, aceto-acetic acid and beta-hydroxybutyric acid. The last two are produced during the course of fat oxidation in the body.

Under normal conditions the acetone bodies are further oxidized to carbon dioxide and water, only a very small fraction remaining in the form of acetone. The acetone is eliminated in the urine, the carbon dioxide mainly in the expired air, and the water by the lungs, kidneys and, to some extent, the skin. It is now believed that these acids are increased in the blood when there is some impairment of carbohydrate metabolism. In other words, normal fat oxidation depends upon normal oxidation of carbohydrates. This is perhaps better expressed in the words of Stevens: "Fats burn only in the fires of carbohydrates and when the latter are deficient the body smokes with unburned fats—ketones." The gravity of the acidosis, according to Peters and Van Slyke, depends upon (1) the rate at which the ketones are produced and eliminated, and (2) the supply of available base for the neutralization of the aceto-acetic and beta-hydroxybutyric acids. This available base is represented by the sodium and potassium bicarbonate of the blood.

EXPERIMENTS have shown that during pregnancy, especially during the latter half, there is a gradual decrease in the alkali reserve of the blood, but that a few days after parturition there is a rise in the alkali reserve and then a return to a normal level. This is substantiated by the fact that Christalon found a 20% increase of the total ketone bodies of the blood from pregnant cows as compared with the blood from non-pregnant cows. The results of experiments show that the total ketones, when expressed as acetone, reach a maximum when they are between 5mg and 6mg per 100cc in the blood of the normal pregnant cow or of the cow that has recently freshened.

A WIDE variation is found in the normal acetone content of cow's urine. Drs. Sampson, Gonzaga and Hayden found the average of six cows was 7.83mg per 100cc of urine. They ran samples on nineteen cows, all sick with some disease other than milk fever or acetonemia, and found no sample over 15mg per 100cc of urine. In a cow which had apparently recovered from milk fever as high as 30mg per 100cc of urine was found. The normal range of total acetone bodies in the urine is taken as 3 to 15mg per cent.

The hypoglycemia is explained by the fact that there is a deranged carbodydrate content of the blood.

THE following case report is a typical case of acetonemia:

**Subject:** Seven year old grade Guernsey cow.

**Case:** Diagnosed as acetonemia and treated by Dr. Fincher.

**History:** The cow calved normally November 27, 1933; was apparently normal but soon began to fall off in milk production and appetite. She had been producing around 60 pounds of milk a day. At the time of the first call, December 13, she was giving only 20 pounds per day. Her ration was composed of four quarts of grain, alfalfa hay and corn stalks. The cow was rather weak, as shown by a staggering gait. She was depressed and stood with her head down. Her temperature was 102°F., pulse 60 and respiration normal. Urine gave a very positive reaction to the acetone test.

This cow was given 100cc of 20% glucose intravenously and the owner instructed to give a pint of molasses twice daily in order to improve the ration a little. A second call was made on December 20. At the first glance at the cow, one could notice the profound nervous disturbance and the poor condition of the animal. The cow was leaning against the side of the pen, head down, eyes half closed, and saliva running from the mouth. Every few minutes she would turn around and then lick her fore legs or the side of the pen. She was chewing but there was nothing in her mouth. Her spine was carried in a typical S-shaped curve which seems to be characteristic of the disease. She stood with her feet wide apart and was reluctant to move, and when forced to, she staggered about the pen. She got her front feet crossed and stood in this position for several minutes. The mucous membranes were normal, pulse 52, temperature 101.8°F. and respirations normal. The heart beat was regular and strong. There was a marked depression of the digestive system. The rumen contracted about once in three or four minutes and was very weak. The peristaltic sounds were diminished; feces somewhat firm but about normal. A catheter was passed to obtain a sample of urine, and when this was done the cow bellowed with pain, jumped around the pen, and it was very difficult to get her to stand still long enough to obtain the sample. When the urine was tested for acetone it gave a very positive reaction. Blood samples were drawn from the jugular vein and milk samples were taken from all quarters. The cow was given 500cc of 20% solution of glucose in the mammary vein and the owner instructed to give a pint of molasses twice daily.

The following tables show the results of blood and urine analysis at three different calls, the last one being on December 28, when the cow, as to symptoms, was apparently normal.

TABLE I

Sample drawn at the first call on December 13.

| | Blood (mg per 100 cc) | Urine (mg per 100 cc) |
|---|---|---|
| Sugar | Analysis not made for sugar | |
| Acetone bodies (As Acetone Calcium) | 7.50 | 37.72 |

TABLE II

Samples drawn on second call, December 20.

| | Blood (mg per 100 cc) | Urine (mg per 100 cc) |
|---|---|---|
| Sugar | 19.3 | |
| Acetone bodies (As Acetone Calcium) | 14.49 | 111.90 |

**TABLE III**

Samples drawn on third call, December 28, when the cow was apparently normal.

| | Blood (mg per 100 cc) | Urine (mg per 100 cc) |
|---|---|---|
| Sugar | 42.4 | |
| Acetone bodies (As Acetone Calcium) | 4.06 | 5.73 |

THE following figures are considered as the normal percentages of the respective constituents of the blood and urine: Acetone in blood, 3-6mg per

100cc; acetone in urine, 3-15mg per 100cc; blood sugar, 40-60mg per 100cc, and blood calcium, 9-11mg per 100cc.

By studying the above table it will be noticed that the analysis of the blood and urine agree with what has been described as characteristic of the disease in the earlier part of this discussion.

Table I shows that the calcium of the blood was about normal but that there was a marked acetonuria.

Table II shows a marked hypoglycemia, acetonemia and acetonuria. The clinical symptoms of the cow were very marked as shown in the case report, and this shows that there is a correlation between the severity of the disease and the percentage of acetone in the urine and blood.

Table III shows that the blood sugar, acetone in the blood and urine had all returned to normal. This further bears out the fact that there is a distinct relation between the findings on blood and urine analysis and the clinical symptoms, since the cow was apparently normal at the time these samples were taken.

This is a case where underfeeding might have been the contributing factor to the cause of the disease. The production of 60 pounds of milk a day is rather phenomenal quantity for a grade Guernsey on only four quarts of grain daily.

*Photo by Alston*

## ACETONEMIA

**Udall states that acetonemia is a disease of well-nourished cows, and New York experience substantiates this view, on the other hand, in the southeastern states where this ailment is equally as common as is milk fever, Alston, who has treated hundreds of cases, finds it chiefly in poorly nourished cows—rarely in cows at pasture. In Alston's experience chloral hydrate given orally is a specific for acetonemia, bringing about recovery usually within 24 hours and often in less time.**

THE differentiation of acetonemia from milk fever is rather difficult to make excepting in typical cases. Acetonemia should be suspected when the onset is not closely related in time to parturition, when suspected milk fever does not respond to calcium gluconate and inflation of udder, and when improvement is followed by recurrent attacks. Examination of the urine by the following method will indicate the presence of acetonemia. The reagents consist of a mixture of one part of fine-powdered sodium nitroprusside with one hundred parts of chemically pure ammonium sulphate and a small pinch of sodium hydroxide flakes or 2cc of $NH_3OH$.

One gram of nitroprusside-sulphate mixture is dissolved in 5cc of suspected urine, then there is added a pinch of sodium hydrate flakes or 2cc of ammonium hydroxide solution and the contents mixed. A permanganate color, which deepens on standing, indicates acetone and aceto-acetic acid, and becomes more marked with the severity of the case.

The treatment consists of the administration of dextrose (50-250gm per vein) in a 25 to 50% solution. Sugar and molasses may be added in chronic cases. Sjollema reports that in Holland they add 100-150 units of insulin to a sterilized and cooled solution of 200gm of glucose in a liter of water; this is injected subcutaneously. The glucose and sugar provide carbohydrates for further combustion of the ketone bodies and reduce combustion of tissue proteins and fats. Calcium gluconate and udder inflation may help in some cases and be useless in others. For chronic cases Hayes recommends a mild purge in several gallons of normal saline solution, combined with apomorphine hydrochloride (gr. jss-ij.). If the season permits, the animal should be turned out to pasture.

# A Peculiar Skin Disease in a Dog

By ARTHUR ROGERS
Ogden, Utah

DURING the past three months I have had an opportunity to watch the development of a peculiar skin lesion in a two-year-old Sealyham, terrier bitch. The first sign of any skin disturbance was noticed in what appeared to be abcess at the point of the shoulder. The abcess was opened in the usual manner and a small quantity of grayish, thick pus removed. The wound was then washed in a mild chlorazine solution daily, and tincture of iodine applied. The lesion healed but not completely.

The application of iodine was at length discontinued and instead zinc oxide was used to soften the tissue and promote healing. Nevertheless the lesion remained static for about a week, and then I noticed that the granulation tissue that had formed was turning white and necrosis beginning. A serum-like substance exuded from the edges of the wound which did not close.

At this time I noticed also two more small, reddened, moist areas near the base of the tail. These looked very much like the first stages of moist eczema, but in the course of a few days a thick scab developed which, when removed, revealed a deep necrotic area. These lesions were surrounded by an extensive area of inflammation, with the edges of the lesion thick and raised. A serum-like exudate was discharged. The outstanding feature of the lesions was the deep necrosis of the skin in these small circumscribed areas and extensive and intensive inflammatory reaction around them.

Four weeks after appearance of the first lesion several more lesions occurred along the back and on the hind legs, all of which were small, about one-fourth of an inch in diameter and characterized by the deep necrosis, inflammation and scab formation from the serum-like exudate.

The case was taken to the Small Animal Clinic of the New York State Veterinary College at Ithaca for diagnosis and treatment. The clinicians had seen no cases of this kind and were uncertain as to the causative agent. A bacterial examination was negative. The condition remained undiagnosed.

*Treatment.*—Tincture of metphen was used first, without benefit. Tincture of iodine was then employed, without any improvement showing. The necrosis did not go any deeper than the skin and the lesions remained at about the same size as at first. When it was quite evident that the iodine was not helpful in healing the ultra-violet ray was used. The animal was placed under the lamp for five minutes daily. After about a week the treatment appeared helpful, and the Kromayer lamp—a water cooled ultra-violet ray that can be applied directly to the skin in limited areas—was used in an attempt to get the beneficial effects of the ultra-violet ray more directly into the lesions, rather than covering the entire body with the ordinary ultra-violet ray lamp. The Kromayer lamp was used five minutes each day and after a few days the skin began to show decided improvement. The edges of the lesions became thinner, began to heal, the area around the lesions showed less inflammation and healthy granulation tissues began to form.

This treatment was kept up for two weeks. By that time the skin was markedly improved and thereafter treatment was given every second day.

Now after three months of experiment and treatment the skin is entirely healed, and to all appearances the animal is enjoying normal health and is looking well.

The diet, which is believed by many to be a factor, and in some instances a cause, of skin disorder in dogs, was not faulty in this case.

## Cauterization in Small Animal Practice

The use of the cautery by the physician is fairly well established. For years he has been using it in various pathological conditions. The practitioner of equine medicine, too, has used the hot iron, ether, benzine, or gasoline cautery quite extensively, particularly for pin and line firing. However, because of their size and difficulty of handling, the use of the aforementioned cauteries is practically taboo for the small animal practitioner.

The use of the electric cautery by veterinarians did not become general until the advent of the small animal practitioner. For about fifteen years we have been using electric cauterization on our animal patients, with splendid results. For several years, we used the pencil type of cautery, which we found efficient but very expensive, the platinum points burning out quite rapidly in addition to being easily damaged. Indeed, we found the expense so great that we finally discontinued its use.

We then purchased a Wappler cautery, which is now known as the "Westinghouse." We found this machine to be almost fool proof, very economical and a splendid apparatus for work on large animals. It was, however, a little too bulky for work on small dogs and cats and its original cost was quite high.

Recently there was placed in the market a combination cautery and light outfit manufactured by the National Electric Instrument Company of Long Island City. We tried this little machine out, and found it economical to run, easy to manipulate and highly efficient. Its first cost is much lower than other makes and the replacing of parts much more reasonable.

### Use of the Cautery

In polypi of the ears, fibromas of the uterus, particularly those near the cervix which are difficult to reach, cauterizing can be carried out skillfully and satisfactorily. In cecetomies, we have found nothing to equal it. In pyometras, the stump can be cut off and cauterized very efficiently. In warts, tumors of the breast and castration of large dogs and cats, it gives splendid results.

One of the practical features of this little cautery is the trigger-like handle which adds considerably to its usefulness. Unquestionably it is a splendid addition to the small animal practitioner's equipment.

Raymond J. Garbutt,
Chief Veterinarian, A. S. P. C. A.
New York, N. Y.

## Increased Efficiency

Some think less food has been produced because of decrease in cattle and but a slight increase in hogs. In answer to this, it is sufficient to point out that with nearly eight million less cattle on hand January 1, 1931, than January 1, 1921, we produced 25 billion pounds more milk and 82 million pounds more beef and veal in the ensuing twelve months than in 1921. With more than four million less hogs on hand January 1, 1931, than January 1, 1921, we produced 1,262,000,000 pounds more dressed pork in the ensuing twelve months than in 1921.—Wayne Dinsmore.

The eradication and prevention of avian tuberculosis in the poultry flock guards the health of swine on the same farm. Swine are commonly marketed when less than a year old. Up to that age they rarely transmit the disease to one another. Hence in market hogs that are sent to slaughter at the usual ages, no procedure need to be taken to protect the animals from tuberculosis except maintenance of sanitary conditions. In the case of breeding stock the tuberculin test should be used to disclose affected animals, which should be removed from the herd promptly and slaughtered under official inspection.

# Coccidiosis Of Rabbits

By LYMAN PECK,
Rahway, New Jersey

COCCIDIOSIS is one of the most common causes of mortality among young domesticated rabbits. Sanitation has been recommended as the best method of control, but in many cases has failed to give satisfactory results. This may be due to the fact that many of the disinfectants used were not effective in preventing the sporulation of the oocysts. The following clinical history of a recent outbreak seems to indicate this.

The rabbitry of Mr. T. Harvey Pope of Plainfield, N. J., from July 27, 1932, to September 2, 1933, produced 94 litters, totaling 618 rabbits.

From July 27, 1932, to February 25, 1933, he produced 48 litters, totaling 325 rabbits. Of this number he lost 295 and raised 30, the mortality being 90.8%.

These rabbits were produced in sanitary steel hutches with wire floors. The hutches were kept very clean and disinfected frequently with various coal-tar and sodium hypochlorite disinfectants. Sanitary conditions were far superior to those found in the average rabbitry.

At various times during this period, sick rabbits were sent to several laboratories and the diagnosis reports all stated, "coccidiosis." About March 15, 1933, Mr. Pope brought several sick, young rabbits to our laboratory and a microscopic examination of intestinal scrapings revealed large numbers of oocysts. The following procedures and treatment was suggested and carried out:

*Treatment.*—Scrub the floors of the hutches with a stiff brush, using hot water to remove organic matter (dirt, food and manure). Then swab them with Iodine Suspensoid diluted, one pound to six gallons of water. During the outbreak, hutches, water and feed dishes should be iodized every other day. Success in controlling coccidiosis depends upon the thorough application of these

measures. Kindling boxes should be iodized just before the does kindle.

From March 12th to May 9th, a period of about 60 days, 22 litters, totaling 135 rabbits, were produced. The mortality from all causes was 37, or 27.4%—less than one-third his previous loss. Five of the thirty-seven rabbits that died are known to have died of accidents. This was quite an improvement, so he continued with the treatment.

The next does commenced to kindle on May 25th, and from then to September 2nd, when the final report was made, they produced 24 litters, totaling 158 rabbits. The mortality from all causes during this period was 9 rabbits, or 5.7%.

IN SUMMING up the history of this outbreak, it is evident that:

1. Wire floored hutches did not prevent the spread of coccidiosis.
2. The use of both coal-tar and chlorine disinfectants failed to control the outbreak.
3. Iodine suspensoid as used was effective in reducing the mortality and stopping the outbreak.

A TABULATION of the litters shows that the size of the litters was far more uniform after the hutches were treated with iodine. This may have been due to the iodine consumed by the rabbits, which were noted licking the wire floors after they had been iodized.

# Lavage and Gavage in Dog and Cat Practice

By J. GILBERT HORNING,
Houston, Texas

*(Continued from last month)*

PART 2.

ABOUT 1920 I first realized the great value of the stomach tube in dog and cat practice and in March, 1924, with Dr. Glenn Kirkwood published an article in VETERINAY MEDICINE on my experience with it; recommending its use as a practical adjunct in this field, giving my technique of administration, with suggestions for its use. The favorable reception of this article showed that I was not alone in my appreciation of the wonderful possibilities of this instrument, and requests for reprints and data on technique have continued even to the present date.

When one considers that disorders of the digestive tract are among the commonest conditions met with in dog and cat practice, one can well understand that in even a limited practice of this kind there is daily opportunity for employment of the stomach tube in either lavage or gavage.

To present this subject as fully as possible, many things have to be taken into consideration, classification of the patient, as much data as possible about the stomach in particular and the patient in general. Knowingly or unknowingly as soon as a patient is presented to us we immediately start to classify the animal, this in direct ratio to our knowledge of the class of animal presented.

The art of practicing medicine is largely the act of noticing, and the more we observe and study the better able we are to practice that art. The privilege of holding an autopsy is frequently granted us and this affords a splendid opportunity of improving and increasing our knowledge. Further, the new interests created, inoculates us with enthusiasm for further study.

Among dogs and cats all individuals vary and the successful clinician must needs visualize the animal before him, consider the type and fit his knowledge of the normal anatomy of the parts in conformity with that particular individual.

THERE are many textbooks that may be used to advantage to review and familiarize oneself with our patients and also as an ever ready reference. Mention will be made of only a few that I have found of great help:

1. Atlas of the Anatomy and Physiology of the Dog, by Sir Fredrick Hobday, F. R. C. V. S., and Harold Stainton, F. R. C. V. S. This is a splendid book, and should be in the possession of every veterinarian. The cost is nominal, about five shillings net, and an expenditure the purchaser will always congratulate himself upon having made every time he reads the book.
2. The Anatomy of the Domestic Animals, by Septimus Sisson, S. B., V. S., is another book essential to the veterinary practitioner. The writer had graduated before this book was published and for the benefit of those who graduated under similar circumstances advises any who does not possess it to order one at once.
3. Pure Bred Dogs, gives the standards of all breeds of dogs accepted by the American Kennel Club with a photographic illustration of a specimen of each breed. It is the best book of this type that I know of.
4. The Cat Standards of the American Cat Association, and the Cat Standards of the Cat Fanciers Association are useful little booklets costing about 25c each.
5. Diseases of the Cat, by Hamilton Kirk, is a valuable book for study and reference.

## Technique of Passing the Stomach Tube

Logically it might be better to discuss the stomach and then give the technique of its administration but as this article is strictly for the profession, the technique will be given first.

The technique of passing the stomach tube in dogs and cats is in most cases

simple. It is, however, a strictly professional procedure and capable of producing serious harm if bungled. Naturally as one progresses in its use it becomes easier; for the novice it is always best to select very docile animals for initial attempts. Fractious patients are better let entirely alone, regardless of the degree of one's skill. I write this after fourteen years' experience in passing the tube. Fortunately one encounters few cases of this type.

In patients having naturally a pleasant disposition or weak from illness the tube can be passed satisfactorily by the skilled operator without assistance. At our hospital most of the cases are handled on the table, except those just stated. Patients that receive the tube repeatedly often become willing subjects.

The attitude of the operator and his assistants has a decided influence on the patient's response. It is somewhat difficult to describe what I mean, but I refer to a sympathetic understanding and feeling for the patient, friendly handling of the animal, never rushing to accomplish the act, the unhurried, gentle manner to relieve the possible tension of the patient, the gentle but firm restraint, talking to the animal, the use of a light touch to open the mouth, a varying approach depending upon the individual handled. All these are factors involved in successfully treating and handling our patients. In some cases force must be used; but properly used, it creates confidence and eventually easy handling.

The patient is held on the table as shown in Figs. 1 and 3. This is the usual procedure for all dogs. Cats are always wrapped securely in a square of heavy canvas and held on the table. After moistening the tube with water, the operator opens the patient's mouth and passes the tube gently and slowly back over the tongue, when the animal starts to swallow (this varies, sometimes it is decidedly noticeable, other times quite faint) the tube is by this action of the animal and gentle propulsion by the operator passed into the pharynx and esophagus and then rapidly on into the stomach.

One can insert the tube rapidly and harshly back over the tongue, and in the majority of cases it will enter the esophagus. It, however, may enter the trachea. There is this possibility in any style of passing the tube, but the slow, gentle start, with the almost imperceptible pause for the assistance of the animal in guiding (swallowing) the tube, constitutes the difference between a good performance and the possibilities of a bungled one.

Should the tube enter the trachea, the animal will sometimes cough. If there is a doubt in your mind pass more tube, gently of course. Measuring the tube on the outside of the animal with its approximate course within will give the operator an idea about the length of tube needed. The trachea is the shorter route; the esophagus requires more tube. If in the least doubt pull out and start over. When it is thought entrance into the stomach has been effected listen at the exposed end for rhythmic breathing of the animal; or place the exposed end in a glass of water; if much air comes out at expiration, withdraw the tube and try again. In most cases a certain amount of gas comes out of the stomach; don't be misled by that—breathing is rhythmic. Use every precaution; one can always withdraw the tube and start it over. It is better to feel safe and be safe.

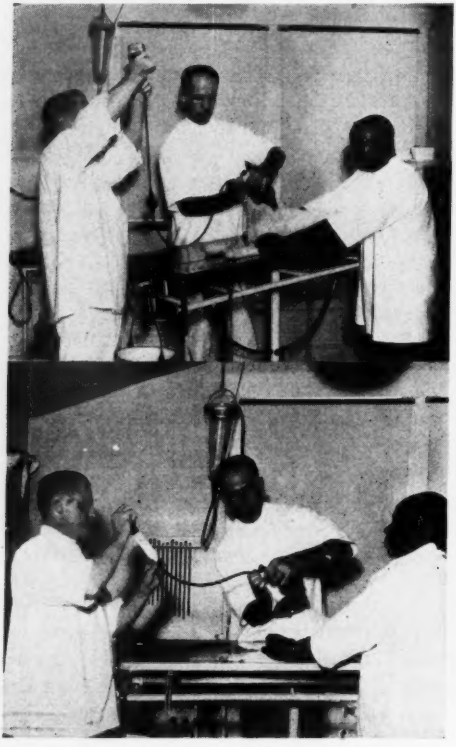
Have the right set of tubes. I wish to lay especial emphasis on this point. Flabby tubes, regardless of how good one's technique may be, will give uncertain performance. The tubes are inexpensive. A good set costs no more than a poor one. Get a complete set, so the right size for the patient. When a tube is damaged order a replacement immediately. Regardless of how good the technique, a tube will be injured occasionally. This occurs usually when the owner attempts to help while the operator is passing the tube.

Clay-Adams Company, Inc., have ar-

ranged a set of tubes according to my specifications. They can be purchased through the Veterinary supply houses. The set, all shown in Fig. 2, consists of:

Two tubes size No. 12 Fr. about 13½ inches in length.

Two tubes size No. 16 Fr. about 13½ inches in length.



**The use of the Stomach Tube in Small Animal Practice. Top Fig. 1; bottom Fig. 3.**

Two tubes size No. 22 Fr. about 15 inches in length.

One tube size No. 22 Fr. about 30 inches in length.

One tube size No. 22 Fr. with rubber funnel and bulb. Total length about 60 inches.

One Becton, Dickinson & Company, No. 2082, two-ounce Asepto Syringe.

The racks for the stomach tubes and the Becton, Dickinson syringes can be made by any carpenter. They are painted a flat white and then painted with two coats of white vitrolite.

The reason for the battery of the three B-D syringes shown in Fig. 2, is: We use one for rectal or vaginal work, one for abscesses, and one for a dose syringe. The glass body and snout permits boiling in the sterilizer and we have found them of great value in our work. They may be purchased of the veterinary supply houses.

At first we sterilized the tubes but we use now hot Liquor Cresolis Compositus

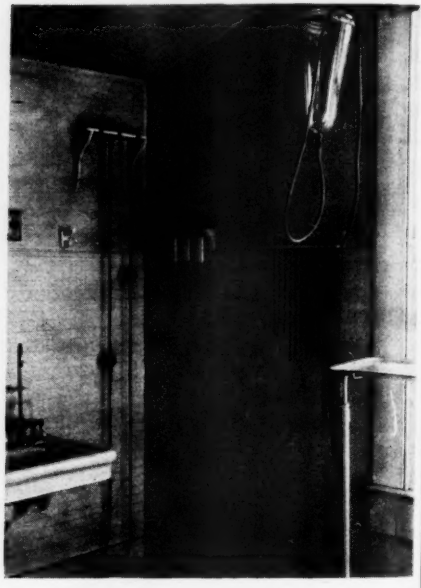


**Fig. 2. Apparatus used by Lavage and Gavage in Small Animal Practice. Left: Tubes with funnel and bulb. Center: Syringes. Right: Set of tubes.**

solution to wash them, then rinse in warm clear water, dry the outside and hang in the rack. Where it is thought necessary to boil the tubes, rubber instead of the cotton woven, lacquered tubes are used. Boiling them, however, is seldom necessary. Naturally in our contagious ward we have a set of tubes for use there.

*(To be continued)*

# Abstracts

By FRITZ VOLKMAR,
Columbus, Ohio

### Disinfection Due to Oxidation

The disinfecting action of potassium permanganate in the tissues depends upon reduction processes[77]. It is the liberation of oxygen which possesses disinfecting power. Higher concentrations than 1 per cent have a corroding effect. During the decomposition of the drug, mangan-dioxyde is formed; this is deposited in the tissue as a brown precipitate. When its deposit takes place in the deeper tissues, then it acts as an intracellular stimulant or adsorbens, capable of preventing the resorption of noxious or harmful substances.

### Blood Changes in Strangles and Distemper

The blood-picture in strangles reveals the approaching abscess-formation;[78] it discloses whether a swollen lymph gland has broken open or not; it possesses prognostic value. The number of leucocytes decreases until abscess formation in lymph glands sets in; the number of leucocytes is increased until the time of the abscess evacuation. There exists a shift of the nuclei in the sense of Arneth whereby the disease progresses in accordance with the phases of Schilling. The number of Jolly-bodies is not increased.

Investigating the blood-pictures of distemper-dogs it was found that the number of erythrocytes decreases during the course of the disease, while the number of leucocytes increases. The examination of the erythrocytes indicated regenerative condition in two cases, and regenerative and hyperplastic condition in one case. The forms observed were: anisocytosis, poikilocytosis, oligochromasy, erythroblasts with and without caryorrhexis, normoblasts with and without caryorrhexis, crescent-shaped forms, Cabot's rings, erythrocyte shades, basophile granules, nuclear malformation, increase in Jolly-bodies. There exists a regenerative as well as a regenerative-degenerative nuclear shift in the sense of Arneth. There occurs also a nuclear shift of the eosinophile leucocytes. The monocytes reach their highest value during reconvalescence. Many leucocytes exhibit increase in volume. The blood-picture possesses prognostic value.

### Brucellosis of Horses

Of 6,000 equine sera examined for Bacillus Bang infection, thirty exhibited a positive complement fixation and a positive agglutination.[79] In none of them, however, could clinical symptoms of brucellosis be diagnosed at the time of the blood test. Two of the horses had a history of fistulous withers, and five had a history of phlegmonous abscesses. A year later, the complement fixation still persisted, but the agglutinability had practically faded out.

### Moist Eczema in the Horse and Dog

The intravenous injection of sodium bromate in cases of greasy heal resulted in disappearance of the moistness and rapid recovery.[80] For acute cases, three to five injections sufficed, healing being accomplished in eight to ten days. For subacute cases six to seven injections were needed, with recovery in 15 days; for chronic cases 15 injections with recovery in about 40 days. Except in chronic cases, no topical treatment was necessary. The same schedule applies to the treatment of moist eczema in the dog.

The sodium bromate is used in a 10% aqueous solution to which 4.7% dextrose has been added. The dosage is 0.4cc per

[77] Thissen, P. 1933. The action of Potassium Permanganate. (Transl. title.) Thesis. Berlin. (Abstr. *Jahresber. Vet.-Med.* 54:317.)

[78] Kovac, F. 1933. The blood picture in equine strangles and in canine distemper. (transl. title) *Vet. Arh.* 3(½):1-81. (abstr. *Rev. Veter. Slave* 1(5):171.

[79] Schellner. 1934. Ueber die Bruzellose des Pferdes. (Equine Brucellosis) *Tierärztliche Rundschau* 40(33): 571-575.

[80] Sidor, K. 1934. Sodium bromate treatment of moist eczema in dogs and horses (transl. title). *Przeg. Wet.* (1):21-27; (2):51-59; (3):95-112. (abstr. *Rev. Veter. Slave* 1(5):179).

Kgm. live-weight. Thus, the dose for horses varies between 150cc and 200cc, and for dogs between 5cc and 10cc, depending upon the size.

### Narcosis in the Horse

Chloral hydrate given per os and intravenously has given most satisfaction.[81] The rectal infusion is used exceptionally. In certain cases the general anesthesia is supplemented by local anesthesia. Chloroform and ether narcosis have been more or less abandoned, because they need close attention in all their phases; they are used for temporary enforcement of the chloral hydrate narcosis. For various reasons avertin is unsuitable for the horse and cannot be substituted for chloral hydrate. The experiments with sulfonal are insufficient for criticism.

### Gall Bladder Lesion in Rabies

Two dogs[85] which had died from rabies exhibited enlarged gall-bladders on postmortem. The conclusion is reached that this dilatation was the result of fasting and of the paralysis of the nerve control apparatus of the gall-bladder wall. The author is inclined to consider these findings of pathognomonic value in the diagnosis of rabies.

### Remedies for Cyanide Poisoning in Sheep and Cattle

The authors[89] tested the efficiency of four suggested remedies for hydrocyanic acid poisoning: sodium thiosulphate, sodium nitrite, sodium tetrathionate and methylene blue. A combination of nitrite and thiosulphate was used in the cattle series.

The animals used were sheep and cattle. The poison was administered as potassium cyanide and was given by drench. The remedies were given intraperitoneally to the sheep and intravenously to the cattle.

As a preliminary measure the m.l.d. and m.t.d. of hydrocyanic acid, given as potassium cyanide by mouth, was determined. For sheep, the m.l.d. was determined to be 2.315mg. per kilo calculated as HCN; for cattle, nearly 2.042mg. The m.t.d. was found to be, for sheep, 0.992mg. per kilo and for cattle somewhat less than 0.882mg.

In the experimental work with sheep 50cc of methylene blue protected against 1.42 lethal doses of cyanide, although 30cc failed to do so. Of the other remedies tried, sodium tetrathionate and sodium nitrite, each protected against 1.42 minimum lethal doses but failed to do so against slightly larger doses. Sodium thiosulphate protected against 1.62 minimum lethal doses. The combination of sodium thiosulphate and sodium nitrite was not tried with sheep.

In the cattle experiments sodium nitrite protected against a single minimum lethal dose of cyanide but failed to do so when 1.5 minimum lethal doses had been given. Sodium thiosulphate protected against 1.39 minimum lethal doses. With cattle the best results were obtained with a combination of sodium nitrite and sodium thiosulphate which protected against two minimum lethal doses. Methylene blue and sodium tetrathionate were not used with poisoned cattle.

The results strongly indicate that in administering any of the substances tried as remedies it is of the utmost importance that they be given very promptly after symptoms of poisoning develop and before the period of respiratory paralysis sets in.

Aside from these remedies no other treatment was given the sick animals. It is the authors' opinion based on their observations of the course of the sickness that in several cases additional treatment such as the stimulation of respiration and

[81] Albrecht, A. 1934. Ueber allgemeine Narkose beim Pferde. Ein Ueberblick über neuere Beobachtungen und Erfahrungen für den Praktiker. (Recent experiences relating to equine narcosis.) *Tierärztl. Rundschau* 40(34): 594-598.

[85] Romanski, S. 1934. Cholecystectasia in dogs: a new post-mortem finding in canine rabies (transl. title). *Przeg. Wet.* (2): 59-63. *Abstr. Rev. Veter. Slave* 1(5): 181.

[89] Clawson, A. B., H. Bunyea and J. F. Cauch, B.A.I.; Remedies for Cyanide Poisoning in Sheep and Cattle. *Jnl. Wash. Acad. Sci.* 24:369-385, Sept. 15, 1934.

general supportive measures would possibly have altered the final result of the cases. It is suggested that, in cases of cyanide poisoning, treatment with the remedies used in this study could well be supplemented by other measures with better chances of success.

Two experiments indicate that the remedial action of nitrite and tetrathionate is physiological rather than chemical.

## Minnesota Wild-Life Disease Investigations

The object of these investigations[90] is to learn what part disease plays in the periodic or cyclic disappearance of game. In the course of these studies, several hundred rabbits were collected either by trapping or shooting, in addition to those found dead from accident or disease.

The number of ticks collected from a single rabbit varied from 8,123 during the latter half of September to as few as five during the latter half of December. The percentage of rabbits carrying ticks fluctuated likewise between wide limits. It appears that the increase in ticks on rabbits as well as on grouse, from reproduction by the ticks, does not take place until after the middle of the summer. The probable tick infection with tularemia varied seasonally from 0.1% to nearly zero. The percentage of previous tularemia infection in rabbits, as indicated by the agglutination test, ranged from 38% in July to 8.32% in October. Tularemia in snowshoe rabbits was observed during the months of May, June, July, August, and October; in cottontail rabbits the disease was found during May, July, September, October, and November. The investigation disclosed the significant fact that tularemia may be present in wild rabbits without marked gross pathological signs of the disease.

Interesting is the observation that tularemia can be isolated from fleas on cottontail rabbits. This adds another important factor to the already large list of carriers of tularemia. Furthermore, this method of transmission seems to be the only plausible means of the disease maintaining itself during the wintertime, as fleas were known to remain numerous on cottontail rabbits during the entire winter.

Another interesting observation made was that it is possible to determine definitely the difference between rabbit and grouse strains of tularemia. In general, guinea-pigs fatally infected with tularemia originating from rabbits die before sixteen half-days, while those infected with tularemia originating from grouse live longer than sixteen half-days.

Tularemia obtained from grouse, or from ticks found on grouse, is less virulent than tularemia from hares and rabbits or from the ticks found upon these animals. It may be implied that the virulence of tularemia found in ticks is probably determined not so much by the kind of tick, as by the species of animal from which the tick obtained its infection. Thus, an infection running a short course in guinea-pigs is typical of rabbit tularemia, and a protracted infection is typical of grouse tularemia. Although strains of tularemia of rabbit and grouse origin are distinctly different when first isolated, yet, as the strains are successively passed through guinea-pigs, they become adapted to that animal and lose their original differential characters. Those findings show a host adaptability of Pasteurelle tularensis heretofore unrecognized. This must be an extremely important factor in the natural occurrence of this disease.

Infestation with tapeworm cysts occurred in 23% of the rabbits examined.

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*Rabbit Horns.*—In 1931 a rabbit specimen, showing the horny protuberances about the head, often described as horns, was obtained for examination. Sections were prepared for microscopic study. It was determined by this means that the growth was in the nature of an infection.

[90] A Digest of the monthly reports on investigations conducted by the University of Minnesota and the Bureau of Biological Survey in cooperation with the Minnesota Department of Conservation for the fiscal year 1933-34.

In 1934 a suspension was prepared from the base of the horny growth obtained from another rabbit. This was used for inoculating a cottontail rabbit from an area where horns are known not to occur. A patch of skin at the base of the left ear was scarified and inoculated with horn emulsion. An intracutaneous injection of the emulsion was made at the base of the right ear. The inoculation was made on February 5; definite horny growths were noted at the points of inoculation on March 1; since then, a large horny growth has appeared at the site of scarification, and a small horn has developed at the point of injection. It may be concluded from this successful inoculation that "rabbit horns" are the result of a specific skin infection, and that the infection is greatly aided in its development by skin injury.

From this rabbit, a portion of the horn from the base of the left ear, where the scarification inoculation had been made, was ground and emulsified in salt solution. Half of this material was passed through a Berkefeld filter. The unfiltered emulsion as well as the filtrate were used in the next experiments to determine whether or not the infectious agent belonged to the group of viruses known as filterable viruses. All transmissions were carried out by scarification of the skin at the base of both ears, and unspecified areas on the backs and sides of the animal. The first two cottontails were inoculated with ground horn emulsion; the second two, with horn emulsion filtrate; and the last two, with ground horn emulsion on the right side and horn emulsion filtrate on the left side.

The first growth was noticed just two weeks after inoculation. Since then additional growth continued to appear and the protuberances have gradually increased in size and "horniness." All rabbits developed horns on the scarified areas which had been inoculated with either horn emulsion or horn emulsion filtrate.

These results indicate that the infectious material passes through a filter, and so belongs to the group of filterable viruses.

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*Diseases of Grouse.*—In the course of the investigations, many grouse were found infected with tularemia, but few died from the infection. It was estimated that about 15% of the grouse were infected with tularemia. The number of ticks on grouse varied from 3,375 (in September) to 0 (in November), indicating that ticks leave the grouse completely earlier than they do the snowshoe rabbits. The percentage infection of ticks was quite small.

Ulcerative enteritis as a natural disease of ruffed grouse was encountered quite frequently. The present status of the pathological study of ulcerative enteritis indicates that this disease is caused by a bacterium within the limits of visibility under a microscope, and that its main effect is produced by growing either in the intestinal contents or in the intestinal wall. The disease was experimentally transmitted to quail with the intestinal contents of grouse. The quail died eleven days after feeding, showing marked loss in weight and lesions typical of ulcerative enteritis. The natural spread of the disease ceases with the onset of cold weather.

* * * *

## Serum Anaphylaxis

Hikmet[92] advises the following measures for the prevention of anaphylaxis: (a) the employment of small quantities of serum at the initial injection, to be followed by a gradual increase in the dosage; (b) the alternation between sera of different animal species (protective vaccination: cattle and sheep sera; curative vaccination; horse and mule sera); (c) attention to agglutinins and hemolysins; determination of blood groups and of the albumen content of sera which had been obtained from different animals. Others recommend abstaining from intravenous

[92] Albrecht, A. 1934. Ueber Krankheitserscheinungen infolge parenteraler Einverleibung von Serum-bezw. Eiweisspräparaten bei Haustieren und Menschen, deren Vorbeuge und Behandlung. (Serum Anaphylaxis) *Tierärztliche Rundschau* 40(17):291-294.

injection in the case of the second application, and to strive toward the use of high-valent sera, in order to avoid large doses. When treating smaller, more sensitive animals, it is advisable to have the second subcutaneous application preceded by an injection of one-fourth or one-half of the proper dose, and to have the remaining amount injected after an interval of about 10 minutes.

Besredka reports that it has been the custom for many years at the Pasteur Institute to heat the therapeutical sera to 54°C. on four successive days, in order to avoid possible contamination when filling the flasks; incidentally, this procedure makes the sera less toxic. This is borne out by the claim that there are less anaphylactic occurrences, incident to serum treatment, in France, than in any other country. Haendel claims that the blockade of the reticuloendothelial system prevents anaphylactic shock.

Besredka names the following drugs as possessing shock-preventing properties: peptone, milk, bovine serum, tubercle bacteria, calcium chloride, glycerine, neosalvarsan, novasurol. Drugs increasing sensitivity are: insulin, thyreoidin, potassium chloride, pantopon. Lohbeck has shown by animal experimentation that the protective colloid and the metal preparation containing it are capable of causing a change of property of the serum in the sense of anaphylaxis and its subsequent phenomena.

Several years ago, Lumiere and Malespine reported that the addition of 0.5cc of a 5% sodium hyposulphite solution to the shock-exciting serum dose will prevent the development of shock in the sensitized guinea-pig. Later on, it was found that magnesium sulphate possesses the same property; it is most effective when mixed with the serum. An already existing shock can be cured by timely injection. According to other authors, the oral application of sodium bicarbonate has the same effect.

Aside from the administration of rather small quantities, the avoidance of the use of very new sera is another recommended prophylactic measure. Since the anaphylactogens are gradually broken up in the liquid serum, there will consequently be but small amounts present after three to four months' storage. At the present time, no definite opinion concerning the preventive action of calcium salts can be rendered.

Besredka and other investigators propose to have the intravenous curative serum injection preceded by a subcutaneous application of a fraction of the serum dose. Fischer is of the opinion that when a serum injection has to be repeated, the anaphylactic reaction cannot be prevented by the recommended fractioned application, regardless of the length of interval at which the species-foreign serum was introduced. Friedberger and Dort recommend very slow injection which would practically amount to fractioned doses. Thus, an absolutely fool-proof and effective preventive does not exist.

The real treatment of conditions incident to serum injection must necessarily be symptomatic. For the relief of the itching sensation and of the pain at the site of injection and in the joints and glands, appropriate drugs in form of ointments should be used. Prolonged bathing of the extremities, and cold packs in case of high fever, are likewise beneficial.

When shock develops, drugs acting upon the vascular system must be used: adrenalin, hypophysin, strychnin, camphor, caffein, black coffee, amyl-nitrite (Kolle-Hetsch). Intravenous injection of adrenalin prove to be successful in the alleviation of anaphylactic shock in a horse, while in the case of cattle, the intravenous injection of ether proved to be equally beneficial. Schmiedinger employed successfully oral administration of black coffee; he combined with this treatment the external application of cold vinegar. In the case of the larger domestic animals it is of advantage to use homologous sera.

# Development of Veterinary Medicine in North America

EIGHTH INSTALLMENT

By D. M. CAMPBELL

## II—THE FIRST PERIOD—1790 to 1850

*History has been written on alternate pages of hope and despair.—Hallgren.*

### 4. MARKHAM'S MISCHIEVOUS TEACHING REVIVED

Veterinary literature made a good start in this country with the publication of Clark's "Veterinary Hygiene" in 1793. It took a long step backward with the publication of Bracken's work five years later. Bracken's work was at least a generation behind the times when the Philadelphia edition appeared. But it remained for a Baltimore publisher and a Pennsylvania veterinary practitioner, after the lapse of another five years to deal the faintly budding veterinary science its cruelest blow, by the publication of a compilation of absurdities already 240 years old; a treatise advocating almost unimaginable cruelties in the treatment of animals handed down by tradition from Medieval Times. Like the Cary-Bracken publication it was intended for live stock owners, not for veterinary practitioners. This at least is a satisfaction. General Smith says of the original (this work is a reprint of an English text), "nothing is more indicative of the depraved taste of the public."

**The Citizen and Countryman's Experienced Farrier,** by J. Markham, G. Jefferies and Experienced Indians, published by Samuel Sower, Baltimore, 1803.

As a treatise on veterinary medicine, this book is wholly worthless and was worthless at the time it was printed, since it represents veterinary medicine in England 200 years earlier. In fact, it is more than 200 years behind the times since Gervase Markham, who wrote it in the early years of the seventieth century, copied much of it from Blundeville, an earlier writer (1560).

The work is a copy of the work by Gervase Markham published first as his "Maisterpeece" in 1610; revised in 1630 as "The Faithful Farrier"; and an elaborate edition of which was published in 1639, two years after the author's death under the title "The Complete Farrier." Markham's text, however, is not given in full; the entire section on surgery (cherurgy) and actions of medicines (simples) and parts of the remainder having been omitted. Certain additions to it which have been made will be mentioned later.

Since Markham's name is sometimes given as Jarvis or Jervais, although it was usually spelled Gervase, the intention may have been to publish this work as an edition of the work of an author dead 166 years, with an added chapter by G. Jefferies, but there is nothing in the title to indicate to the purchaser that G. Jefferies and J. Markham were not residents of Baltimore at the time and the book a new work by them. We cannot conclude that it was other than an intentional fraud on purchasers. The "Experienced Indians" was probably included in the authorship to help sales, since there is but one reference to Indians in the whole book and that to a treatment intended for persons, not for animals. Whatever its purpose it possesses much interest and considerable significance.

Until within a generation, medical fakers in this country have set great store by the sales value of "Indian remedy" when given to their nostrums and many "patent" medicine companies, until recent years, marketed a complete line of nostrums, the formula for each of

which was supposed to be a secret obtained from some Indian. Apparently no Indian remedy has ever been offered for animals, except that some of the nostrums aforementioned were stated to be "good for man and beast." The Indian medicine-man never enjoyed a reputation for exorcising devils and diseases from animals; and this work appears to be the first and only attempt to capitalize any reputation that Indian mysticism may have had in veterinary medicine. That it wasn't repeated justifies the assumption that it didn't pay—a credit to veterinary medicine.

The conclusion seems inescapable that a fraud was intended in the publication of this book. It may have been by the publisher and G. Jefferies may have been a figment of the publisher's imagination, but it seems more probable that G. Jefferies was the perpetrator of the fraud. He may not have known that Markham had been dead a century and a half, and may have thought that the use of his name as co-author was acknowledgment enough of the purloined text. It seems unlikely. Probably he was familiar with the circumstances and used the name Markham[6] because of its established reputation. The "Experienced Indians," we surmise, were just as ghostly as the senior author and as little responsible for the contents of the book as was the elder ghost for its publication.

The first 60 pages of the work deals with dieting, exercising, grooming and conditioning for races, the rearing of foals and caring for mares, breeding, the age and conformation of the horse. The discussion is of little value and was much out of date even when first published.

The remainder of the book, comprising nearly 300 pages, purports to give prescriptions used by a number of persons, who presumably were veterinary practitioners, such as "Mathew Hodson's medicines; approved receipts for curing all diseases incident to horses," presumably copied from Markham; "Nathaniel Shaw's approved receipts"; and "Hanson's receipts." Beginning with Hanson's receipts the "running heads" for the remainder of the book are "Complete Farrier," the title of Markham's work and not "Experienced Farrier" the title of this one. Either of two explanations are suggested to account for this: that Markham's work was so well known that readers would understand the circumstances, or the more probable one that because of indifference, slovenliness or downright laziness, the page headings were not changed when the copy was given to the printer.

The final 75 pages in the book are credited to Jefferies and his wild coauthors, as follows: "The experienced receipts of George Jefferies of Chester County, Pennsylvania, and of a number

[6] VETERINARY MEDICINE for May, 1927, gives the following concerning Markham and his abominable veterinary works:

Gervase Markham, born 1568, died 1637 a scholar, a prolific writer, a soldier, a riding master, but most of all a parasite, a man without principle, rightfully dubbed by his uncle a "lying knave." His first work appeared in 1593 and for a decade thereafter, he wrote a book a year and many others followed. He was a great linguist and knew intimately Latin, Italian, French Spanish and Dutch. He wrote works on romance, drama, agriculture, military organization and training; poems and veterinary works, of which the latter were by far the most popular; the one he called his "Maisterpeece," dominated the field of veterinary literature for a hundred years and ran to about, if not quite, 40 editions. It did incalculable harm.

Markham was a teacher of equitation, not a veterinarian or farrier. His veterinary works like his agricultural works, were copied bodily from earlier authors. The "Maisterpeece" was copied principally from a work of Blundeville, published in 1566. So the quotations from Markham do not reflect veterinary matters in 1675 (Markham had been dead nearly 40 years at that time) but veterinary conditions of more than a hundred years earlier, going back to near the middle of the 16th century.

J. Lawrence, in 1812, said of Markham's veterinary writings: "The mischiefs which have been occasioned by the extensive circulation of this man's books are incalculable. They brought almost as many evil and cruel inflictions upon poor helpless animals as the opening of Pandora's box did upon the human race . . . . the work which received his last hand is but mere repetition of the barbarous and unmeaning absurdities of former times."

General Fred Smith in his History of Veterinary Literature, says of Markham: "Every book he wrote, every preface penned, proclaim his want of veracity; he possessed the most complete contempt for truth. . . . His system of publishing was pernicious and shameless. The same work was issued to the public by two different titles, and by the process of extracting portions from already published books he built up others. He rarely revised a book; a new title page was sufficient, with perhaps a few trifling alterations in the text. . . . It is safe to say that, so far as treatment was concerned, the pernicious effects of Markham's 'Maisterpeece' lasted for one hundred years after the death of the compiler, and that nothing before or since has exercised so disastrous an influence on veterinary education and progress."

of experienced Indians. The following receipts may in some measure be accounted more natural, as the productions are of this climet[7], and consequently nearer connected; that is, the creatures in distress and the herbs and vegetables for their relief."

However, no matter from whom the "receipts" were taken the similarity is great and as each author had from one to six infallible receipts for every known or imagined disease of animals, this constant repetition served chiefly to double or triple the number of pages the book would otherwise have had, and make it a sizable volume for which the publisher (or author) could ask a considerable price.

About the only evidence that Jefferies "experienced receipts" were actually American and not copied from an earlier English writer as was all the rest of the books, is the fact that he mentions glanders but once, a very rare disease in America at that time, whereas the remainder of the book contains more remedies for that disease than almost any other, indicating its prevalence in England 300 years ago.

However, Jefferies' standbys, like the principal remedies used by the other writers, were strong ale, white wine and old urine, although pretty much the whole pharmacopea of Markham's time is requisitioned in one or another of the receipts; particularly an amazing number of plant drugs are mentioned. Jefferies exhibits an entire lack of originality. For example, he copies Markham's famous concoction of a suckling mastiff pup, disemboweled, filled with live snails and roasted. It would have required little originality to change the breed of the puppy; this much at least might have been expected from one who presumed to instruct.

It is in Jefferies' section that the only reference to Indians occurs and it is thus: "An old Indian cure for ulcerous sore legs in men. Take sassafras leaves, dry or green, in winter or summer, apply on the sores a poultice thereof with milk and hog's lard, renewing it occasionally —when the poultice is off apply the leaves, which will cure very easy to the patient. I have been credibly informed that the Indian has cured white people by this when the surgeon said their leg must be cut off." Surely this is a slender thread upon which to hang a claim that the volume was in part the work of "experienced Indians."

In most instances, the diseases are merely mentioned by name, as glanders; hard kernels under the throat; bots and other worms; mourning of the chine; to rot a sore or swelling; splent (splint); chest founder ("swinney"); foot founder (laminitis); yellows; pestilence; swelling under the jaws; navel gall (ill); dry scurvy; falling of the fundament (prolapsus recti); vives; squinsey; running from the nose more than a year; gourded legs; scratches; grease; fistula; rage of love in mares (nymphomania); farcinose, etc. Only occasionally are symptoms given—just the name of the disease and the "infallible remedy" with directions how to make it and how to give it. Rarely is the cause of an ailment mentioned.

An idea of some of these "priceless receipts" may be gained from the following typical examples. The headings are our interpretation of the conditions for which the treatments are intended:

### Glanders, Ozena, Strangles

*A Medicine for the Glanders.*—Take a quart of red vinegar, no wine vinegar; put it over the first, and add to it two spoonfuls of English honey, two spoonfuls of Elecampane, beaten into fine powder, and searsed through a fine searse; as much rock allum as the size of an egg, beaten into fine powder; after all these have boiled together for a quarter of an hour, take it off the fire and put to it half a pint of sallad-oil; then let it stand until it be milk-warm, and give your horse six spoonfuls in each nostril, with a little horn:—ride him two or three turns, then tie his head down to his foot for four hours, and let him fast that time. Give this drink at 9 different times, being 3 days between every drink, every second time that you give him his drink, give him chickens-guts warm, rolled

[7] This admission that the major part of the text was a foreign production in some measure exonerates Jefferies and Sower from charges of intentional fraud. It should be remembered, however, the reader was not given this information until after he had purchased the book. That is, the title does not indicate the book was a copy of an older work.

in beaten bay-salt, and put them down his throat: feed him with warm water and wet hay all the time he taketh the drink. This will mend the glanders, and the mourning in the chine.—*Proved.*

*To Stop the Glanders Until You Sell Your Horse.*—Take a pound of green elder bark, beat it in a mortar, and strain it, then add a quart of ale and give it to the horse; do so for three mornings together.

*To Cure the Kernels Under a Horse's Throat.*—First sear the kernels with a candle, then take butter, spread it on a red cloth, and rub it well in, and in a fortnight's time the knot will be quite gone; and if his nose runs it will stop when the kernels are gone; annoint the knots once a day for a week, in the time of his cure. If it be in summer, let him run out, and if in winter, let him stand in.—*Proved.*

*For Hard Kernels Under the Throat.*—Mix soap and brandy together, and apply it to the kernels hot; then heat it with a hot iron, it will either sink them flat or break them.—*Proved.*

### Oestrus Infestation—Strongylosis

*An Approved Cure for the Botts, and All Kinds of Worms Whatever.*—Take a quart of new milk, and as much clarified honey as will make it very sweet; give it luke warm to the horse very early in the morning, he having fasted all the night before; then bridle him up to the empty rack two hours. Afterwards take a pint of white wine, and dissolve a large spoonful of black soap in it, being well incorporated, give it him to drink, and let him fast two hours after it, and the worms will void in great abundance.

*Another Receipt for the Botts, or Worms, the Most Easy and Certain Without Sickness.*—Take the soft downy hairs in the ears of an horse, which you clip away when you poll him, and the little short tuft which grows on the top of his forehead, underneath his fore-top, a good quantity of each; mix them well with a half a gallon of sweet oats, and give them to the horse. There is nothing that will kill worms more certainly.

*For the Botts.*—Take half a pint of urine, a gill of rum, of pepper and gun powder a large spoonful each—shake them well together, and teem it in [drench] your horse. It is said to be an absolute cure.

### Strangury

*An Infallible Help for the Stone, or Pain of Urine, Causing Sickness.*—Make a strong decoction, viz.: Boil your first quantity of water to half a pint, three times over, with keen onions clean peeled, and parsley; take a quart thereof, and put in it a great spoonful of molasses, and as much of the powder of egg-shells, finely searsed, give it to the horse to drink. Do so for many mornings, if the infirmity be great, otherwise when you see the horse in pain.

*A Scowering Drink to Cleanse His Kidneys if They Be Pained.*—First heat a pint of strong beer in a skillet, skim it, put in a little treacle-jean, and give it him luke-warm; three or four hours after it, give him a mash, warm water the first day and no longer. Let him stand in two or three days.—*Proved.*

### Mange, Elephantiasis

*For Any Mange, Scab, or Leprosy Whatever.*—First let blood, then take a quart of old urine or vinegar, and break into it a quarter of a pound of best tobacco; then set it on the fire where it may simmer and not boil, and let it stew all night; then strain it, and with the water wash the infected place, whether in the mane or other obscure place. It is a certain remedy.

### Nail Prick, Puncture Wounds

*To Draw Out a Thorn or Nail in Any Place.*—Take house snails, seethe them in butter and apply them; they will draw out any thorn or nail; or the root of reeds bruised and bound to the wounded place with a linen cloth. He may run out, but to stand in is best.—*Proved.*

### Bronchitis, Heaves, Dyspnea

*For an Old or New Cough, or the Heaving of the Lungs.*—Take the root of gentian, slice it, dry it and beat into powder, give the beast as much of this powder as will lie upon a shilling, in half a pint of his urine warmed; give him this fasting once in three days, and so continue every third day till you see his cough and heaving to abate or quite gone; he must be kept in all the time of his cure. This for an old cough or heaving of the lungs is the best cure.—*Proved.*

*For a Broken-Winded Horse.*—Take boar's dung, dry it to powder, and put a spoonful of it into two pints of milk, just from the cow, and give it him. If it does not make him sick, give him two spoonfuls more of the powder, and in four or five times giving, it will perfectly cure him. It must be given every third day.—*Proved.*

### Superficial and Deep Wounds

*An Ointment to Skin or Heal Any Wound or Hurt.*—Take two spoonfuls of dog's grease, one of black soap, and the size of a hazzle-nut of rock allum burnt and powdered; put the burnt allum in when the others are melted and taken off the fire, and stir them well together in an earthen vessel, and it will keep a year.

### Splint—Exostoses

*For a Splent.*—You must cast the horse, then beat the place with a stick until it is soft, and fleam it in three or four places upon the splent, and squeeze out the blood with your stick and your finger and thumb. Take as much hog's grease as a walnut, and as much bole-armoniac and brimstone; beat these two last to powder, mix them with grease, spread it upon a sheet of grey paper, and lay it upon the splent, then heat a brick very hot, and dry the medicine in with it, then melt some black pitch in an iron pan, and dip some flocks in it and dab it on close all over the splent, that it may stick fast, and when the flocks comes off, the splent will come out; but if the flocks come out before the splent, lay on more till the splent comes out, as soon as it comes out, wash it with a little white-wine vinegar, and anoint it with sallad-oil and turpentine, melted together, and cooled; use it once a day, and the splent will come out and be whole in a week.

It makes a great blemish, and takes away hair and flesh and sometimes the hair comes no more.

### Mastitis

*For a Cow That Hath a Garget in Her Dug.*—You shall know when she hath a garget in her dug

[udder], for then she will not give down her milk. Let her stand in the house or yard the night before you let blood; next morning fasting let her blood on both sides of the neck, then give her this drink: take a handful of mullin, cut in small, and afterwards boil it a little in a pint of beer, and give it to her luke-warm, fasting. Once given will make her give down freely.—*Proved.*

### Abscess of the Pharyngeal Lymph Glands, Catarrh of Gutteral Pouch

*Of the Vives.*—For the vives, which is an inflammation of the kernels between the chap [jaw] and the neck of the horse, take a little pepper, a spoonful of swine's grease, the juice of a handful of rue, two spoonfuls of vinegar; mix them together and then put them equally into the horse's ears and tie them up with two flat laces, shut the ears that the medicine go down, then let the horse blood in the neck and temple veins.

### Canker of the Foot

*For the Running of the Frush.*—Take alum and old urine, make it hot, and wash and cleanse the foot, and dry the sore with a linen cloth—then take some nettles, dry and pound them to powder—and take some pepper, pound it and mix it with the powder of nettles, and strew it into the wound, and stop it in with flax or hards.—*Proved.*

### Ophthalmia, Deafness, Burns, Wounds

*For Sore Eyes.*—The juice of onions is excellent to wash sore eyes, takes away dimness, mists, clouds, spots, haws. If used in the beginning, dropped in the ears it is good against deafness, noise or ringing in them; the juice mixed with oil and the juice of pennyroyal, applied, is good against all burnings with fire or gunpowder and heals wounds made by gun-shot.—*Proved.*

### Dislocations

*For Bones Out of Joint.*—First swim your horse in some pond, creek or river [a very old treatment for dislocations], and if that does not bring the joint into its place, then cast your horse on his back, and put four strong pasterns on him below his fetlock; and draw him up by his legs so as his back may no more than just touch the ground; then draw the grieved leg higher than the rest till the poise and weight of his body have made the joint shoot into its place again, which you may know by the crack it will make when the joint falleth into its place. Then gently loose him and let the horse rise, let him blood in the plate vein, or in the master vein, which is the big vein that is in the inside of the thigh; then anoint the grieved place with the ointment for broken bones, or else with the oil of mandrakes, or the oil of swallows, both which are of sovereign virtue.

*For the Hurl-Bone Out of Joint, or a Little Miscarried.*—The hurl-bone is about the midst of the buttock, and is very apt to go out of the socket by a flip or strain. The oil of turpentine and beer is very good. After shaking it in the glass, pour a little of it just over the socket of the hurl-bone, and rub it in with your hand. It will cause the skin to purse up and be very sore. You must anoint him on the brawn and thick part of the inside of the thigh, and so down to the stifle, and anoint him down to the very foot. Drive a wooden wedge in the contrary foot, between the toe and shoe, and so let him stand day and night. If you see your horse mend and go better, you may ride him every day, and put in the wedge when you return, and he will soon be cured.—*Proved.*

### Stiff Back, "Jinx" Back, Strains

*For a Horse That Is Back-Swankt, or for a Strain in the Kidneys, Being Over-Burthened in the Hinder Part, or in Race Running, or by Being Overstrained in the Back.*—Take a fat hot sheep-skin, just as it comes from the back of the sheep, mix a little nerve-oil and a little turpentine well together, and besmear and anoint the inside of the sheep-skin all over, and clap it to the part of the back that is sore; which commonly is the navel place of the back-bone. In that part of the back-bone is a horse mostly swankt of. When you have thus laid it along his back-bone, make a crupper to go under his tail to keep it on, and a breast-plate before, and fasten them together, so girt them upon him for a month, till his back be knit and strengthened.—*Proved.*

*For a Strain.*—Hog's grease is very good for a sinew-strain, or any other part of a horse.

*For a Shoulder Strain.*—First tie up his sound leg very sure with a lift or garget, then walk or drive him on three legs that he may lay the weight of his body upon the lame leg till he begins to sweat at the ears and cods the pain.—*Proved.*

### Induced Estrum

*To Cause a Mare to Conceive.*—Take a good handful of leeks, and stamp them in a mortar with four or five spoonfuls of wine, then put thereunto twelve flyes, called Cantharides, then strain them all together with a sufficient quantity of water to serve the Mare therewith two days together, by pouring the same into her Nature [vagina] with a Clister-pipe made for the purpose, and at the end of three days next following, offer the Horse unto her that should cover her, and after she is covered, wash her Nature twice together with cold water.

Another treatment for the same:

. . . take of Nitrum, of Sparrows dung, and of Turpentine, of each a little quantity well wrought together, and make a suppository, and put it into her Nature, and it will case her both to desire the Horse, and also to conceive. . . . There be some of opinion, that it is good to put a Nettle into the Horse's mouth that should cover her.

It is a matter for satisfaction that no second edition of this worthless text appeared; indicating as it does that it did not meet with a ready sale. In England, Markham's works went through many editions; selling well for more than 100 years after the death of the author.

The copy of this work examined is the property of the Flower Veterinary Library of the N. Y. State Veterinary College.

## ARMY VETERINARY SERVICE

Major Lloyd C. Ewen is relieved from his present assignment and duty at Ft. Sam Houston, Texas, effective at such time as will enable him to proceed to San Francisco, Calif., and sail on the transport scheduled to leave that port on or about October 13, 1934, for the Hawaiian Department.

Lt. Colonel Clell B. Perkins, is, in addition to his other duties, detailed as attending veterinarian at Forts Slocum and Wood, New York, the harbor defenses of eastern and southern New York and Sandy Hook, N. J., and at the headquarters, Second Corps Area.

The following officers of the Veterinary Corps, having been found by an Army retiring board incapacitated for active service on account of disability incident thereto, and such finding having been approved by the President, their retirement from active service on September 30, 1934, under the provisions of section 1251, Revised Statutes, and the act of Congress approved April 23, 1930, is announced:

Colonel Walter Fraser,
Colonel William A. Sproule,
Colonel Andrew E. Donovan,
Colonel Robert C. Musser,
Major Vincent B. Wright.

### Veterinary Reserve Corps

**New acceptances:** Johnston, Elmer Jos., Major, Box 730, Excelsior Springs, Mo. Anderes, Robert Louis, 2nd Lt., 1817 Church St., Evanston, Ill. Bailey, Lee Kenneth, 2nd Lt., Leesburg, Va. Bentham, Wilfred Sylvester, 2nd Lt., 5430 Claremont Ave., Oakland, Calif. Ellis, Jos. Leslie, 2nd Lt., 5214 S. Sheridan Ave., Tacoma, Wash. Merriman, Clarence Chas., 2nd Lt., 5618 So. 19th St., Omaha, Nebr. Purse, Wm. Jos., 2nd Lt., 9357 E. Colfax Ave., Aurora, Colo. Smith, Robt. Markwood, 2nd Lt., W. Washington St., Jamestown, Ohio.

**Promotions:** Hart, Charles Henry, to Major, 138 King St., St. Paul, Minn. Sanders, Charles Lee, to 1st Lt., 705 S. Main St., Dayton, Ohio.

**Transferred to Aux. Reserve:** Turner, John Pollard, Col., 1357 Kennedy St., N. W., Washington, D. C. McKibben, Robert Webber, Capt., 216 W. 2nd St., Waynesboro, Pa.

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We are submitting the following case to our experts on animal psychology to see, if by any chance, there is a possibility of trying the same treatment on the horse, that worked so well with Olaf.

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for Heart Worms (Canine Filariasis). An isotomic double salt of Antimony in solution ready for intravenous use.

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and had a little chat with Olaf. He asked his patient about the condition of his worldly affairs, for, he added kindly, this type of major operation does not always terminate as one could wish.

After the surgeons had left the room, Olaf began to get scared. In his imagination he could see himself sitting on a cloud, clad in a pure white robe, trying to sing a Swedish hymn to the accompaniment of his twanging harp. He could also see the hired man sitting on the sofa with Hilda, his bereaved and grief-stricken widow, but who seemed to be rapidly recovering from her lamentable affliction.

As these thoughts crowded his now thoroughly awakened intellect, peristalsis resumed its normal


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functioning, and the more he thought of the operation and its possible termination, the more active the peristaltic waves became. Jumping out of bed, Olaf grabbed his pants and shoes, slipped them on his fast recuperating body, and fled out of the hospital, headed for the nearest pool hall.

If the track coach of any large university could have seen the sprint Olaf put on up the alley, he would have enrolled him at once in the physical education department, and felt that the 220-yard dash was already won.

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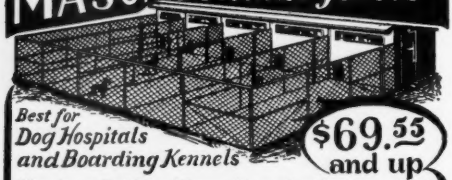

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called up his wife, who asked the surgeon what his fee for the trip and other trouble would amount to, which she promptly paid.

That evening, Olaf ate heartily, drank three cups of coffee, and has never been sick since. Any time his intestinal tract becomes a little sluggish, all he has to do is to think of the white hospital bed, and the faraway odor of the operating room. The pneumogastric nerve immediately sends out impulses to the muscular walls of all the organs involved, and the need of any therapeutic agent is thereby avoided.

Olaf told us this story while we were treating a horse for impaction out at his ranch, and we have set it down in his own simple style.

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